

"TAKE IT HOME!"

YOUTH AND

QT  
T243w  
1858

WOULST

KNOW

THYSELF.

OR

THE OUTLINES OF

HUMAN PHYSIOLOGY.

DESIGNED FOR

THE YOUTH OF BOTH SEXES.

BY MRS JANE TAYLOR.

Illustrated with Numerous Anatomical Engravings.

NEW YORK:

PUBLISHED BY GEORGE F. COOLEIDGE & BROTHER,  
329 PEARL STREET, FRANKLIN SQUARE.

And also published and for sale by all the principal Booksellers  
throughout the United States of America  
and its Territories

OLD AGE!!

RETAIL PRICE.

CENTS

MAN IS FEARFULLY AND WONDERFULLY MADE

THIS IS A

VALUABLE BOOK FOR CHILDREN

## TWELVE GOOD REASONS

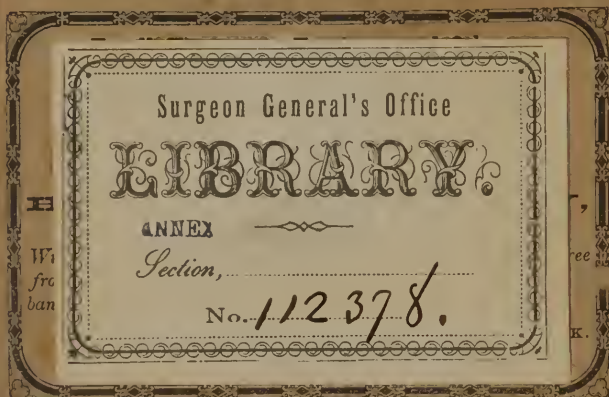
### Why PHYSIOLOGY should be made a common Study.

*First.* Because it is a study that may be made as interesting as a book of pleasant stories illustrated with pictures.

*Second.* Because it tells us how we are formed, the construction of the human frame, and how life is sustained in our bodies.

*Third.* Because it tells us how our health may be preserved, and how, by a neglect of the laws of nature, it may be destroyed.

*Fourth.* Because it tells us why we are enabled to do many things that, without this knowledge, we should not know how we did them.



*Fifth.* Because it tells us what kinds of food, air, and habits of living, will promote the health and strength of the body and the mind.

*Sixth.* Because it tells us how our bodies are warmed, and why they are warm when the atmosphere around us is extremely cold.

*Seventh.* Because it tells us the cause of all our ails, aches, and pains, and by what habits of living they may be prevented.

*Eighth.* Because it tells us what care is necessary to preserve our teeth, and our senses of sight, hearing, feeling, tasting, and smelling.

*Ninth.* Because it tells us what kind of clothing and how much we should wear to protect our bodies from the extremes of heat and cold.

*Tenth.* Because it tells us how our lives may be prolonged, and how we may, by the blessing of God, attain a healthy and cheerful old age.

*Eleventh.* Because it tells us that we can not possess correct moral feelings, or a sound mind, unless we keep our bodies in a healthy state.

*Twelfth.* Because it tells us why that it is better to contract good habits, than those which are sure to give us pain and shorten life.

# HINTS TO YOUTH AND THE GUARDIANS OF YOUTH.

"Just as the twig is bent the tree's inclined."

Forms which may be cultivated,



Representing a full-chested and erect man, one so rarely seen, although it is no more than can be obtained in nearly every person by cultivation. A person with such a chest would be free from all disease of the Lungs or Heart, and would have all the indications of being a robust and long-lived person.

Forms contracted by neglect,



Representing a man of stooping form with small lungs and chest. Such a person would be almost sure to have some disease of the Lungs, Heart, or Stomach, and would naturally be Consumptive, and short-lived, because the vital powers are small. Care should be taken to avoid contracting such a form.



Representing an erect and full-chested woman. Such a person would naturally have a strong constitution, and could endure a great amount of labor, either mentally or physically. The European Ladies are more generally of the above form than the American, because they take more interest in cultivating a full chest and fine form.



Representing a facsimile in form of a great many women that are daily met with. Such persons are usually troubled with that sinking sensation, or 'goncness' at the pit of the stomach, which is always produced by the pressure upon it in stooping, and might be prevented by care in keeping back the shoulders and expanding the chest.

# HEALTHY AND UNHEALTHY POSITIONS ILLUSTRATED.



**Improper Position.**

**Proper Position.**

Learn to sit up, young man, and to imitate your opposite neighbor; for the unnatural position which you have assumed will never make you a good writer. A bold upright position, with the pen held loosely between the fingers, and a determined purpose to imitate some definite copy as nearly as possible, is the only true road to success in the art of writing or good penmanship.



**Healthy Position.**

**Unhealthy Position.**

An upright position, in either sitting or walking, favors a healthy action of all the various organs of the system, and besides, it gives a graceful and dignified appearance to the human form. Children and adults are more or less inclined to lean forward with their heads upon their elbows, even when their seats are provided with backs; such a position oft repeated must in time result unfavorably.



**Correct Position.**

**Incorrect Position.**

See how that round-shouldered youth is sitting with his shoulders against the chair-back, and the lower portion of his spine several inches from the back of his chair, giving his body the shape of a *half hoop*. Parents should regard such a position in their children with apprehension as to the result, and should rectify it at once.





Fig. 1.



Fig. 2.



Fig. 3.

### Old Style and New Style of Desks and Seats for Schools.

Too many schools are furnished with seats of the same uniform height. If they are high enough for the larger scholars, they are too high for the smaller children, (see fig. 1). In sitting a child should find a support for the back, and rest for the entire thigh-bones and feet, otherwise the bones of these, being soft and growing, are liable to become distorted or out of shape. Fig. 2 represents a proper position, and fig. 3 an improper position, for sitting.



### Proper and Improper Position to lie in Bed.

Curvatures of the spine may be caused by too many pillows upon which the head rests while in bed as represented above. Young persons should lie as nearly level as possible with the head but slightly raised if at all. As they advance in life, a more elevated position of the head may be desirable. Most people lie upon the right side, some lie upon the back, but this latter position is not favorable to those who are liable to nightmare. A change of position is very desirable.



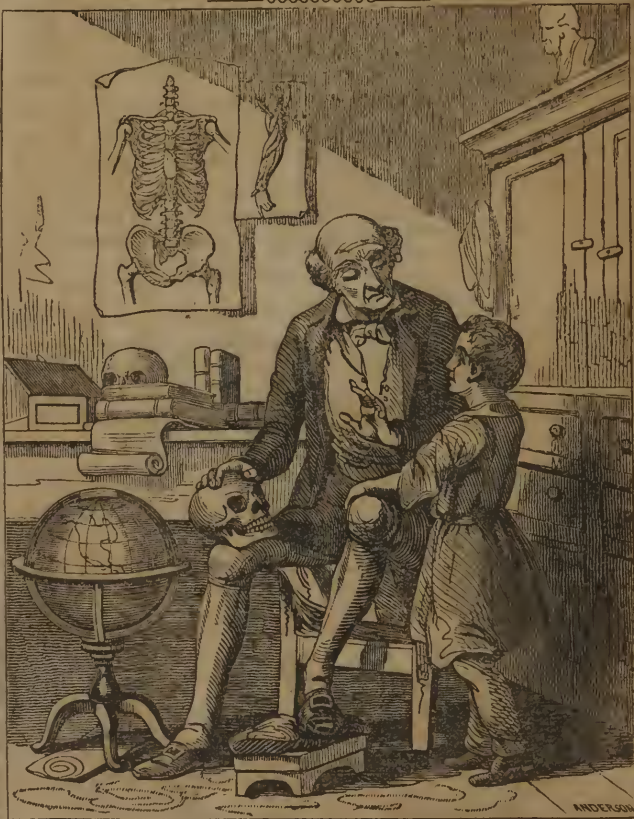
### A Curved, Round-Shouldered, and Erect Spine.

How very distressing, and yet how common, it is to see curved or deformed spines. The habits of children, especially of girls, if not corrected in time, create a fearful frequency of this spinal defect. Nature has given to all, both male and female, a sufficiency of bone and muscle to sustain them in the most graceful and healthy position, and when these are correctly and faithfully used, and their strength developed, they fulfil their intended purposes and keep the form erect.

## A VERY INTERESTING SUBJECT!!

*A Book that should be in every Family and School in the United States and its Territories.*

**A MUCH NEGLECTED BUT MOST IMPORTANT STUDY.**



**YOUTH.** *Of what use is the study of Human Physiology?*

**OLD AGE.** It teaches us how to preserve our health; what kinds of food, air, and habits of living, will make us sickly; what practices will be likely to shorten our lives; and how, on the other hand, we shall most likely attain, with the blessing of God, a healthy and cheerful old age.

ENTITLED,

Wouldst

KNOW THYSELF!

OR

THE OUTLINES OF

HUMAN PHYSIOLOGY!

BY MRS. JANE TAYLOR.

DESIGNED FOR THE USE OF

FAMILIES AND SCHOOLS.



TO PARENTS AND TEACHERS.

THIS book may be used with great interest as a reading class book in families and in schools. The parent or teacher reading the questions and the children or pupils reading the answers; and thus reading the book through and through until the important lessons it contains shall be fully impressed upon their youthful minds.

NEW YORK:

PUBLISHED BY GEORGE F. COOLEGE,

323 PEARL STREET, FRANKLIN SQUARE.

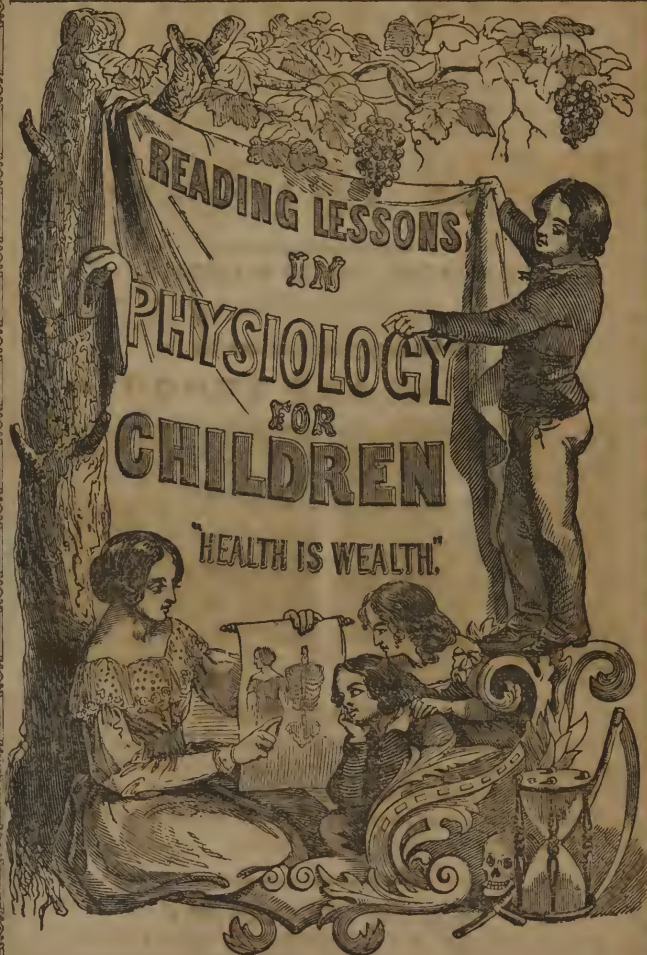
And also published and for sale by all the principal Booksellers  
throughout the United States of America,  
and its Territories.



QT "KNOWLEDGE IS POWER."

T243W

1855 By knowledge we do learn ourselves to know;  
And what to man and what to God we owe."—SPENSER.



Entered, according to Act of Congress, in the year 1858,

By GEORGE F. COOLEDGE,

In the Clerk's Office of the District Court of the United States, for the  
Southern District of New York.



## "KNOW THEN THYSELF."

"The proper study of mankind is Man."—POPE.

### AN ADDRESS TO PARENTS AND TEACHERS.

PHYSIOLOGY may seem a hard word for the title of a child's book, and the subject it presents may, on that account, appear difficult of comprehension to the young; but this is only because it is new or uncommon. The subject is not often presented to children, and, therefore, the word used to designate it is not familiar to their ears. Physiology is not, in reality, a harder word to pronounce than Geography. They are both Greek words in their origin, and the meaning and use of the one are just as easily learned as the other. *Geography* is a description of the *earth*. *Physiology* is a description of *nature*, and is confined to such things as have life, as man, animals, and vegetables. These three departments are called *human*, *animal*, and *vegetable* physiology.

This little work is devoted to *Human Physiology*, and explains, in an intelligible and interesting manner, the structure of the human frame, the form and uses of its several parts, the means to be employed for their preservation and perfection, and the sources from which danger is to be apprehended. It will be found to contain many useful hints about clothing, diet, exercise, health, and the care of the body generally, which, if faithfully studied and observed by those for whose benefit it has been prepared, may ward off many a fit of sickness, save many a doctor's bill, and lengthen out many a life, to say nothing of the more perfect development of the form, the improvement of the complexion, the preservation of the teeth, &c., all of which suffer incalculably, from the simple fact, that neither parents nor children understand a word of physiology, but leave all that relates to their physical training and health to chance and the care of the doctors.

A careful study of this little book will open the eyes of parents and children to the wonders of our physical frame, which, as the psalmist beautifully says, "is fearfully and wonderfully made," and to the wisdom and benevolence of the Creator in the adaptation of the parts to their ends, and will lead parents, instead of feeling surprised that carelessness, neglect, exposure, and indulgence, produce so many pains and diseases, to exclaim, with Watts—

"Strange that a harp of thousand strings,  
Should keep in tune so long."

NEW YORK, *January*, 1858.

J. T.

## A HINT TO PARENTS AND TEACHERS.

It was the original intention in this compilation of facts in Physiology to state them in the simplest language; but as the work progressed it was found necessary to use more *comprehensive words*, that a large number of facts might be embodied in a limited space. Some of these words may not come readily within the comprehension of the young scholar; it would, therefore, appear quite necessary that their signification should be fully explained by the instructor as they occur, where it has not already been done in the work. To this end, each parent or teacher should be provided with a **DICTIONARY**, both for their own and their pupils' benefit, as there is not a word in this book the meaning of which should not be clearly explained for the better understanding of the subject upon which it treats.

Every family and school should possess a Dictionary of the English Language, as a book of constant reference; for with an imperfect knowledge of the accurate meaning of words, it must follow that an imperfect understanding of facts is conveyed to the mind when reading upon any subject.

---

## TABLE OF LESSONS AND SUBJECTS.

LESSON	PAGE
1.—The Subject of Physiology explained.....	7
2.—The Human Body.....	9
3.—The Muscles of the Human Body.....	13
4.—Muscular Effects of Habit.....	15
5.—The Skin, or Covering of the Human Body.....	17
6.—The Brain and the Mind of Man.....	20
7.—The Nerves and the Nervous System.....	21
8.—The Sense of Touch or Feeling.....	23
9.—The Tongue, or the Sense of Taste.....	25
10.—The Nose, or the Sense of Smell.....	26
11.—The Ear, or the Sense of Hearing.....	27
12.—The Eye, or the Sense of Sight.....	29
13.—The Heart, or the Circulation of the Blood.....	33
14.—Breathing, or the Heart and Lungs.....	35
15.—Animal Heat, or Warmth of the Body.....	38
16.—The Stomach, or Food and its Digestion.....	41
17.—Physiology of the Teeth.....	46
18.—The Human Throat, or the Voice.....	49
19.—The Hair and the Nails.....	52
20.—Clothing and Dress, or the Protection of the Body.....	54
21.—Exercise of the Body and the Mind.....	58
22.—Effects of Alcoholic Spirits on the Body.....	60
23.—Man, or "the Human Form Divine".....	62
24.—Longevity, or the Length of Animal Life.....	63

*"How poor, how rich, how abject, how august,  
How complicate, how wonderful, is man."—YOUNG.*

## LESSONS IN PHYSIOLOGY.

### LESSON FIRST.

#### The Subject Explained.

*What is the meaning of the word Phys-i-o-l-o-gy ?*

This word is formed from two Greek words, and means a *description of nature*.

*What part of nature does it describe ?*

Organized or animated nature.

*Does physiology treat of earth, water, air, rocks, and minerals ?*

No, for these being inanimate and unorganized have no life.

*Does it, then, treat only of plants, brute animals, and man ?*

Yes, of these alone ; for only these have life.

*When it describes plants, what is it called ?*

*Vegetable physiology.*

*What is it called when it describes animals ?*

*Animal physiology.*

*What part is to be found in this book ?*

*Human physiology, or that part which speaks of man.*

*What good will it do to study this ?*

It will teach us how to preserve our health ; what kinds of food, air, and habits of living, will make us sickly ; what practices will be likely to shorten our lives ; and how, on the other hand, we shall most likely attain, with the blessing of God, a healthy and cheerful old age.

It will teach us, also, that we can not habitually possess lively, correct moral feelings, or a sound mind, unless we so live as to preserve a sound body.

*Do most people understand these things ?*

No ; they study almost everything else but themselves.

*Why have not people generally studied physiology ?*

Because the books that have been written on the subject have not been made sufficiently simple and plain to make the study interesting.

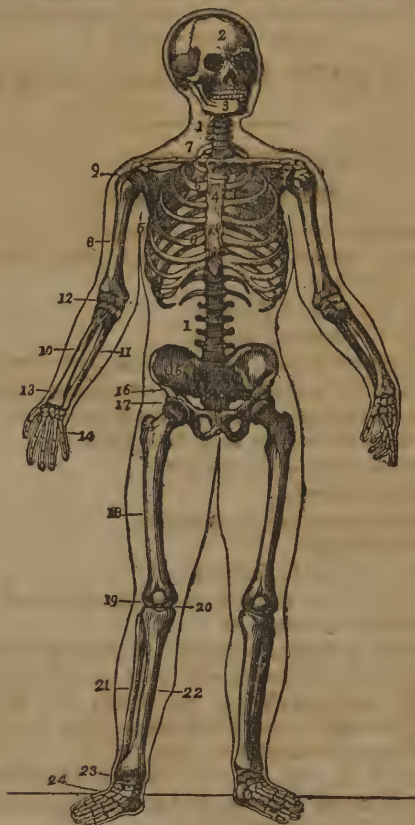
*Can physiology be made a pleasing study ?*

Yes, one of the most so that can be put in a book.

*Does this little book make the study so pleasing ?*

You will see that it makes physiology as easy to be understood, and as interesting to read, as a story with pictures.





### The Frame of the Human Body.

The names by which the different bones in the human body are known.

- |  |  |
|--|--|
| 1. The back-bone or spinal column.   | 12. The elbow-joint.   |
| 2. The skull or head of the human body.  | 13. The wrist or joint by which the hand is united to the arm.         |
| 3. The under jaw or detached bone of the skull.  | 14. The bones of the hand.   |
| 4. The sternum or breast-bone.   | 15. The pelvis or haunch-bone.   |
| 5. The ribs or protection of the heart and lungs.  | 16. The sacrum, a wedge-shaped bone at the lower end of the back-bone. |
| 6. The cartilages which connect the ribs with the sternum or breast-bone.                | 17. The hip-joint.   |
| 7. The clavicle or collar-bone.  | 18. The thigh-bone.  |
| 8. The humerus bone of the arm.  | 19. The patella or cap of the knee.                                    |
| 9. The shoulder-joint.   | 20. The knee-joint.  |
| 10. The radius } two bones running parallel with each other from the elbow to the wrist. | 21. The fibula or lesser bone of the leg.                              |
| 11. The ulna }   | 22. The tibia or shin-bone of the leg.                                 |
|  | 23. The ankle-joint.   |
|  | 24. The bones of the feet.   |

## LESSON SECOND.

## The Human Body.

*What kinds of substances are found in the human body?*

Solids and fluids.

*What constitutes a solid?*

That is called a solid, the small parts of which adhere together so closely and firmly, that they do not separate by their own weight. A stone, a piece of wood, a lump of clay, a leaf, &c., are solids.

*What constitutes a fluid?*

That is called a fluid, the parts of which adhere together so feebly as to separate readily by their own weight, when not confined in a vessel. The parts of a fluid move easily among themselves, and readily change places, in any direction, with each other. Water, milk, blood, and all kinds of liquids, are fluids.

*Will you name some of the solids and some of the fluids of the body?*

Bones, muscles, and nerves, are solids. Blood, tears, and gall, are fluids.

*Which is the hardest solid in the body?*

Bone.

*Where are the bones in man placed?*

Under the skin and flesh of the body.

*Where are the bones of lobsters, oysters, clams, crabs, and other shell-fish, placed?*



On the outside of the body. Their bones are called shells, and serve to protect them from injury.

*Why are the bones of man not on the outside of the body?*

If he was covered with bone like an oyster he would have but little or no feeling or knowledge.

*Of what use are bones to man?*

They make his body stronger, and keep it upright. When a carpenter builds a house, he makes and raises the frame first. Bones are the frame of the body. The flesh and skin are put on them as the carpenter puts boards, shingles, and plaster, on the house-frame.

*Are the bones of children hard?*

No; the bones of children are very soft, and easily bent;

but they become harder and stiffer as life advances. The bones of old people are dry, hard, and brittle. Children are sometimes taught to stand alone, and to walk, when *so young*, as to bend the bones of their legs, and thus make them bandy-legged or knock-kneed for life.



There is a tribe of Indians in North America called *Flatheads*. This name is derived from their custom of binding pieces of board to the front and back of the heads of their infant children. The hard wood, pressing against the soft bones of the head, flattens it; and this pressure is continued till the bones, become hard enough to retain, through life, the unnatural shape thus forced upon them. In the same way, any pressure from without, if long continued, will alter the shape and position of the bones in any part of the body.

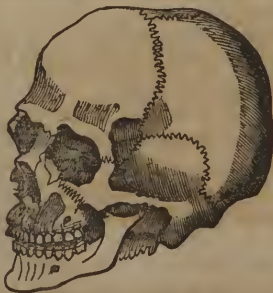
*Do not tight clothes, then, injure the body?*

Yes; when very tight, they not only crowd the bones out of their natural places and injure their shapes, but they prevent the free and uniform circulation of the blood: thus *tight* clothes not only injure the general health of the body, but sometimes occasion sudden death.

*What are bones made of?*

They are made from and of our food, after the food has been changed into blood. As the blood circulates through the body, certain portions are secreted, or separated from it, to supply the several solids and fluids of the body. This secretion is continually going on, so that every part of the body is constantly fed out of the blood.

*How many bones are there which give form and shape to the skull or head?*



Side View of the Skull.



Top View of the Skull.



Eight bones or picces, and these are united like two saws when the toothed edges are pressed together. To make this comparison more exact, the saw-teeth should be a little crooked, so as to hook into each other.

*How many bones are there in the human face?*

Fourteen, aside from the teeth, which will be described hereafter.

*Are there any other bones in the head?*

There are four small bones in each ear. These ear-bones help to convey the sound to the brain. There is also one at the root of the tongue: making in the whole head *sixty-three* bones, including the teeth, above the upper joint of the neck of an adult or grown person.

*What is the back-bone, its formation and use?*



The back-bone, or spinal column, is that which extends from the bottom of the skull behind, down along the middle of the back. It is made up of twenty-four short, round, and perforated bones, termed *vertebræ*, in *Latin*, but in our language *vertebers*, and having some resemblance to so many rings piled one upon another. This resemblance, however, is not very exact; for the vertebbers are not perfectly round, and they have, each of them, several projecting points, which, with the elastic cartilage between every two vertebbers, serve to link and bind them all together, and thus form that strong, upright, and yet flexible column, which gives erectness, dignity, and grace, to the human body. This spinal column, moreover, is largest at the lower end, or base, because at that point it has the most weight to sustain.

*What makes this bone crooked in some persons?*

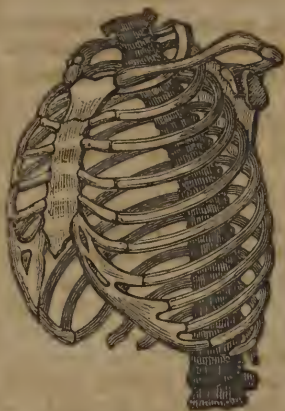
The careless habit of stooping or leaning forward, remaining too long in a one-sided position, sitting too long without anything to lean the back against, tight-lacing, and the want of suitable exercise in the open air.

*How many ribs has the human body?*

Twenty-four; twelve on each side. They grow out of the spine, forming a hoop by meeting and being fastened to the breast-bone in front.

*What is the use of ribs?*

They are the framework of that part of the human trunk



Back-bone and Ribs.

termed the *chest*, in which the lungs and heart are deposited for safe-keeping.

*What and where are the shoulder-bones ?*

They are two broad, flat bones, lying over and fastened to several of the ribs behind and at the upper part of the chest.

*Of what use are the shoulder-bones ?*

They furnish sockets, or rests, for the arms.

*What and where are the collar-bones ?*

They are two long slender bones passing over the ribs in front from the highest part of the shoulder-bones to the head of the breast-bone.

*Of what use are the collar-bones ?*

They prevent the arms from sliding too far forward.

*How many bones are there in each arm ?*

Three: one between the shoulder and the elbow, and two between the elbow and the wrist.

*How many bones has the wrist ?*

Eight, all being wedge-shaped, and strongly united together by ligaments or gristle.



*How many bones are there in the hand and fingers ?*

Nineteen. These are also strongly secured together.



*How many bones are there in each foot ?*

Twenty-six ; all strongly fastened together by ligaments.

*How many bones are there in each leg?*

Three ; one between the hip and knee, and two between the knee and ankle. There is also a small bone or cap over each knee, called the knee-pan.

*What is the bone called upon which the spine or back-bone rests?*

The *pelvis*, and it has four parts.

*How many bones are there in the whole body?*

Two hundred and forty, in an adult or grown person.

*Who have sound, healthy bones?*

Those who eat wholesome, nutritious food, and who exercise frequently in the open air.

*Who have diseased and unsound bones?*



They who work in mines, and in damp, poorly-lighted places ; they who sleep in close rooms, where the air is stagnant and impure ; they whose food is usually too scanty, or of a poor quality ; they whose bodies while laboring are kept constantly bent, or in any posture which prevents the free

circulation of the blood and the natural action of the vital organs.

*How often does the entire body change?*

Every person has another and a different body every ten years ; the previous one having gradually wasted away, and a new growth, by degrees, having taken its place.

### LESSON THIRD.

#### The Muscles of the Human Body.



Muscles of the inside of the Arm and the Hand.

*How many muscles are there in the human body?*

It is supposed that there are not less than four hundred and fifty.

*Of what are the muscles composed?*

They are composed of the fleshy parts of the body.



*Is all flesh, then, muscle?*

All the *lean* flesh in the body is, and this is composed of parts or fibers; each part, or number of parts, united into one, is called a muscle.

*Of what shape is a muscular fiber?*

It is long, round, and fine, like a thread. Some of the larger muscles are made up of a number of these long, fine strings of flesh; as a skein of thread is made of a number of threads.

*To what are the muscles fastened?*

To the different bones of the body.

*Of what use are the muscles?*

They are the instruments by which we move the different parts of the body; for by them we perform every motion.

*How do they enable us to move?*

They have the power of *contracting*, by which their two ends are drawn nearer to each other, thus moving the bones to which they are attached. This contracting power is subject to the *will*, and we exercise it when we please, without knowing how we do it. A piece of India-rubber contracts after having been stretched out, springing back to its original form; so the muscles become shorter at one time and longer at another, whenever we employ them to move the bones of the body.

*What is the color of the muscles?*

They are of a deep red or blood color.

*What appearance do they give to the body?*

A full, plump appearance. When an animal has lost the greater part of its flesh, or what is the same thing, its *muscle*, it looks thin and shrunken.

*Is a muscle the same as a sinew or tendon?*

No; a sinew is white and gristly; it is a solid, elastic, and strong substance, neither so hard as bone nor soft as muscle. Muscle is simply *lean flesh*, which gives form and protection to the body.

*Of what shape are the muscles?*

The larger muscles are the largest in the middle and taper toward the ends. (See the muscles of the arm, page 13.)

*Are the sinews a part of and connected with the muscles?*

Yes; they are the *tapered ends* by which the muscles are connected with and fastened to the bones; some of these are very long and slender, particularly those which extend from the knees or connect with the toes. The muscles and tendons vary in size according to the duty they are required to perform.

## LESSON FOURTH.

## Muscular Effects of Habit.



*If around a large limb of a tree, I bend a small limb, and, by tying it fast, keep it in a bent, crooked form, what will be the result?*

The small limb will grow twisted, and out of shape.

*If a boy, or a girl, be in the habit of standing with the shoulders crooked over, will not round shoulders and a flat chest be the consequence in after-life?*

Certainly; our habits change our forms and natures; for habit is so strong that it is called "second nature."



*How should we stand, that the form may be natural and healthy?*

Upright, with the breast thrown forward and the shoulders backward, as we see in the picture.

*Why is this position the most healthy?*

Because it gives free action to the circulation, the ribs, the lungs, and other vital parts of the body.

*What does stooping cause?*

It causes short breathing, pain in the chest, and a mean diminutive appearance.

*Will a person stand more at ease, labor better and more quickly, and travel further in a day, whose position is erect, than one possibly can who stoops or bends forward?*

Yes; the body and limbs being in a proper balance, less effort is required to do these things.

*Which is the most correct position for speaking, reading aloud, or singing?*

A firm, upright position, the person standing, not sitting.

*If we eat good food, and exercise freely in the open air, shall we always have good health?*

No, it is necessary that *all* our habits should be good also.

*What are habits?*

There are different ways of doing the same thing, and when we become accustomed to any particular way, by frequent practice of it, it is then called a *habit*. Habits when long continued, are very difficult to change.

*Name one of the habits most important for the promotion of health?*

The habit of eating moderately is one. If you swallow

your food, without chewing it much, it will do you but little good. You can not long have good health, if you eat too fast. Your teeth were given you to be used, in preparing food for your stomach. Your mouth is like a mill, and nothing must be allowed to pass through it, without being ground very finely.

*What other important habit will you tell me about now ?*

The habit of sitting and standing erect, is a very important one. Some children are always leaning on one side, or lounging over chairs and sofas. They weaken their backs and limbs in this way, and acquire an awkward figure and gait, which they can never afterward correct. The back-bone was made to support the body ; and if we allow it always to do so, without constantly leaning, or stooping, it will always be firm and strong.



A Proper Position.

An Improper Position.

*What evil consequences result from the habit of stooping and leaning ?*

The ribs are crowded together, and the natural action of all the vital organs of the body are disturbed.

*Can you mention any other habits ?*

Order and regularity are of great importance. So, also, are early rising, cleanliness, and industry.

*Which part of the body needs to be most carefully guarded from cold and damp weather ?*

The feet should always be protected with special care. "Keep the feet warm and the head cool, you will always find a wholesome rule."

*What ! should not the head and neck be guarded more than the feet ?*

No ; there is much less danger from exposing the head than the feet. Thin shoes and thin stockings are deadly foes to health and beauty.

*Are not many people in the habit of bundling up the neck with furs, thus keeping the head and neck very warm ?*

Yes ; and they are usually complaining of headaches, sore throats, or coughs. As a general rule, take good care of the feet, and the head will take care of itself.



## LESSON FIFTH.

**The Skin, or Covering of the Human Body.***What is the human skin?*

It is that which covers the body, as bark covers a tree.

*Has a person more than one skin?*

Every person has three skins; the innermost one of the three is called the *real skin*.

*Of what is this real under skin composed?*

It is composed of blood-vessels and nerves, which cross each other in every direction. These blood-vessels and nerves run so near to each other, that they appear to have been woven through in a net-work.

*Is this skin strong and elastic?*

It is, and can be stretched like a piece of India-rubber.

*Is the under or real skin of the same color on every person?*

It is in every respect the same.

*Then why is it that the skin of some people is black and of others white?*

Over this under-skin, of which we are speaking, there is another skin which is quite thin, and all over this thin skin is spread something which looks like jelly; and it is this jelly matter which gives color. In white persons this jelly substance is white; in the negro it is black; and in the Indian it is copper-colored.

*Has the color of this substance ever been known to change in any one?*

A single instance, or a "freak of nature," as it is called, is related of a woman once wholly black, whose face, arms, and body, became in after-life, nearly covered with *white* spots, about the size of a half-dollar; a few of them were larger.

*What can you say of the outside skin?*

It is very thin, but not equally so over the whole body; for on the hands and bottom of the feet it is much thicker, and sometimes very *hard* and *tough*.

*If a piece of this outside skin is peeled or cut off, will it grow again?*

Yes, in a short time; but if the under, or real, skin is cut off or destroyed, it will not grow again.

*If you cut or destroy the outside skin will pain be felt, or blood appear?*

No; neither of them.

*Upon whose hands do we find this outside skin the thickest?*

Upon the hands of farmers, masons, sailors, laborers, and others, who are employed in laborious occupations.

*Why is this so?*

By constant labor with the hands the outer skin becomes

harder, thicker, and tougher, and thus the inner real skin, which is tender and easily injured, is protected in handling hard and rough things. The more the exposure, the greater becomes the protection. "*In wisdom has He made them all.*"

*Does the jelly matter which gives color to the skin, appear again, if it is cut or torn away?*

Yes; it appears as soon as the outside skin is restored.

*Is the thin outside skin very firm and tight?*

Yes, and full of little holes, or *pores*, as they are called. These pores are so numerous and near to each other that you can not put between any of them the point of the finest needle. Their number on the surface of the skin has been estimated to be several millions.

*What are these pores, and what is their use?*

They are the mouths of little tubes, sometimes called the *perspiratory ducts*; and they carry off in the form of perspiration, much of the refuse matter of the body; matter which having been rejected by the organs, is very injurious to remain in the system. A full-grown healthy person throws off from two to three pounds of this matter every twenty-four hours.

*What is a cold, and its effects on the health?*

It is the stoppage of this rejected matter which ought to pass off through the pores. Sometimes it gets back to the lungs; and then it produces a cough, and is thrown out in the form of phlegm. Sometimes it goes to the head and produces the feeling of fullness of the head, headache, sneezing, &c.

*Which is the best way to get rid of a cold?*

Open the pores again by warm bathing and rubbing the skin vigorously, with a coarse towel, or flesh-brush. The current of action will soon return from the inward to the outward parts of the body, and the system will be thus relieved. While we have a cold, we should eat sparingly, particularly of animal food, and take as much exercise as the strength of the constitution will permit.

*Can you tell why the skin is so full of these little holes or pores?*

Yes; to let the useless noxious matter that has been rejected by the digestive and secretive organs, pass off.

*In what form does this matter escape?*

In the form of sweat, or perspiration, and of a very thin vapor which should be kept uninterruptedly flowing out of the body from every part.

*What follows, then, when these pores become closed?*

Pains, cough, headache, irritation and burning sensation of the skin, and sickness in various forms.

*Why do these ills follow?*

The reason is, as already stated, the poisonous matter which should depart through the pores of the skin, is retained in the body.

*In what other way do these pores sometimes become stopped?*

By not keeping the body clean. We should wash freely and rub with a coarse towel, the *entire* body every day.

*Do persons usually have good health who neglect washing themselves all over frequently?*

Some do, for a time, but they generally, sooner or later, suffer for the neglect.

*Should cold or warm water be used in washing the body?*

Cold water is thought to be the best for persons in health; and a coarse towel, or flesh-brush should be used in all cases, not merely to dry the surface, but to excite the skin to action, and produce that fine glow which is the proof of benefit from the whole operation.

*What part of the day is the best for bathing?*

The morning. Yet a person in good health and of a good constitution may take a bath at any hour, excepting just after a hearty meal.

*If people were more particular to keep their skin in a clean, healthy state, would they suffer as much as they do from colds and sore throats?*

No, they would not.

*What is one of the most convenient modes of bathing?*



In the morning, on leaving bed, step into an empty tub, and having placed a basin of water within reach, pour it on the body with the hands, or from a sponge, or a towel, rubbing the flesh at the same time. Continue this for a minute or two, then rub the whole surface vigorously, with a dry and coarse towel, till the body is all in a pleasant glow, then dress immediately.

This is a simple mode of bathing, consumes but very little time, and all it costs is only a small degree of *resolution* at the outset; for after the practice has once been adopted and become a habit, it is so agreeable and is felt to be so beneficial that few will be willing to forego it.

*What is the best sort of cosmetic to freshen the complexion and produce a cheerful countenance?*

This kind of bathing and purification of the skin; and not powders, paints, or drugs of any kind.

## LESSON SIXTH.

## The Brain and the Mind of Man.

*Has each part of the system its own work to perform ?*

Yes. The business of the lungs is to draw in the air to purify the blood, the business of the stomach is to receive and digest the food, which is afterward converted into blood, &c.

*What is the great business or function of the brain ?*

• To manifest the mind. It is the organ or instrument by which the mind performs all its operations.

*Is the brain, then, the mind ?*

No. The *eye* is not *sight*, because it is used in seeing, nor is the *ear*, *hearing*, but the organ of hearing. The brain, likewise, is not the mind, but the organ of the mind, or seat of the intellectual and reasoning faculties of man, such as thought, memory, hope, love, hatred, ambition, &c. In brute animals the brain is the organ of what is called *instinct*.

*Of what is the brain composed ?*

Of matter which is subject to decay.

*What is mind ?*

It is not matter, but the spirit which animates matter, and which will live for ever.

*How many things are necessary in order to see an object ?*

Five. An object, light, an eye, a nerve running from the eye to the brain, and the brain.

*Suppose there is an object, light, an eye, and a nerve, and no brain, can an object be seen ?*

No. The brain is the seat of all sensation and knowledge. And the mind acquires a knowledge of outward objects, through its mysterious connection with the brain.

*Does a proper use of the mind strengthen the brain ?*

Yes. The more the brain is exercised, if not overtaken, the more prompt and vigorous will be the operations of the mind.

*What will be the effect if the brain is permitted to remain inactive ?*

It will lose its healthy state, and all the operations of the mind must, in consequence, be dull and feeble.

*Is the brain active or inactive during a state of sound sleep ?*

It is inactive. A person may be touched while in a state of sound sleep, and not perceive it, or be conscious of it.

*If an injury comes to the brain what will be the effect ?*

The whole system will become instantly affected, and if the brain be seriously injured death will at once or soon ensue.



## LESSON SEVENTH.

## The Nervous System.



*What does this picture represent?*

It represents a head, with the scalp turned down, the top part of the skull removed, the membrane raised, and the brain exposed.

*What is the scalp and its use?*

It is the covering of the skull, composed of fat, muscle, and skin, out of which grows a thick body of hair, serving to protect the skull from injury.

*Where is the brain situated?*

The brain is in the head, occupying the whole inner part or cavity of the skull, but separated from it by a thin membrane.

*Of what is the brain composed?*

Of a soft pulpy substance resembling marrow, filled with blood-vessels, the whole having a grayish color.

*How large is the brain in a grown person?*

It is about six inches long, five inches wide, and four inches thick. It weighs from three to four pounds, and will fill the two hands of a man.

*Has a person more than one brain?*

Yes, there are two brains; a large one called the *cerebrum*, and another about one eighth as large, below and behind it, which is called the *cerebellum*. These two brains are equally divided into two parts by a deep cut or separation, reaching nearly through them from front to back. These halves of each brain are precisely alike in shape, and together form a pair of brains, just as we have a pair of eyes and ears.

*Does all of the substance called the brain lie in the head?*

No; small portions of it run off in every direction, from the top of the head to the extremities of the body.

*What are these parts of the brain which run through the body called?*

They are called nerves, which together form what is called the nervous system.

*What, then, is the nervous system?*

The nervous system consists of those parts of the brain which, in small strings, extend throughout the whole body.

*Are all the nerves connected with the brain?*

They are, for each nerve is but a part or extension of the substance of the brain.

*Where do we find the nerves?*

In the ends of the fingers, in the toes, and in every part of the human body.



*Which is the largest nerve in the body?*

The spinal marrow.

*Where is this situated?*

In the centre of the spine, or back-bone; extending from the middle of the brain, down between the ears, and through the neck.

*Does this large nerve send out small ones through the body?*

Yes, it does in great numbers. Small parts of the brain also branch off to the ears, eyes, nose, tongue, &c.

*Of what use are nerves?*

They give us feeling. Without nerves we should be without feeling. If no nerve connected the eye with the brain, we could not see; neither could we smell nor taste if no nerve connected with the nose or the tongue.

*If a nerve is cut or destroyed what will be the effect?*

The organ to which it is attached ceases its function entirely.

*When we feel the prick of a pin why do we suffer pain?*

Because the pin pierces a nerve. If an animal had no nerves you might pound or bruise it, and it would feel no pain.

*Are there any animals or insects without nerves?*

No. It was formerly supposed that some insects were destitute of nerves, but recent investigations have clearly shown that all insects possess a nervous system.

*Have nerves any other use than to give us feeling?*

Yes; we have two prominent classes of nerves; one of *feeling* and the other of *motion*. One class of the nerves causes us to feel, and the other class causes the muscles to move. Thus in raising the arm, the nerve connecting the brain with the muscle carries the wish of the mind to it, and the muscle contracts or expands compelling the bone of the arm to move. There are also nerves connecting with the brain, all the various functions of the system, the circulation of the blood, breathing, the digestion of food, &c.

## LESSON EIGHTH.

## The Sense of Touch or Feeling.

When I press my finger against the point of a pin, pain or rather the sensation of pain is felt. Many people would say that they felt the pin; but pain is felt as well as the pin. The prick or pain tells me the pin is there.

*What is the cause of this feeling, or sensation as it is called?*

The pin touches a nerve, and the nerve carries the impression, made by the pin, to the brain.

*When anything touches the body, what is produced?*

An outward or external feeling or sensation.

*Are there any inward or internal feelings?*

Yes, hunger and thirst are internal feelings.

*How many kinds of feelings, then, have we?*

Two. External feeling caused by something touching the body, and internal feeling, caused by hunger, thirst, &c.

The external feelings are called *senses*, and are five in number, viz., seeing, hearing, feeling or *sense of touch*, tasting, and smelling.

*If we could neither see, feel, taste, hear, nor smell, what should we be?*

We should be human beings in form only, without the power of self protection. Instances are related, however, in which persons had but the sense of touch in perfection, and yet exhibited intelligence, and were able to express their wants and desires. The loss of one sense is generally attended with greater acuteness in the remaining senses.

*What is the duty and office of the senses?*

To convey knowledge to the mind through the nerves.

*How does feeling, or sense of touch, for instance, carry this to the mind?*

The sense of touch or feeling, like all of the other senses, is on the outside, and gives warning to the mind when anything comes in contact with the body.

*What is the object of this warning?*

To keep us from harm. If we had, for instance, no feeling in our feet we should be likely to put them into water so hot as to blister and even destroy them; as did once happen to a man who had lost the sense of touch in his feet.

*How do we know rough from smooth, cold from hot, sharp from blunt?*

By the sense of touch, or the sensation produced upon the mind through the agency of the nerves and brain.

*Is the sense of touch more acute in healthy than in diseased persons?*

Yes. The purer the blood the more acute are all the senses.

*Can we tell how much heat there is in anything by this sense of touch ?*

Not exactly ; for a piece of iron will *feel* colder than a piece of woollen cloth, though both the iron and cloth have the same degree of heat in them.

*How is this ? Why does the iron feel colder ?*

The hand has more heat in it than either the iron or the cloth. But the iron absorbs the heat from the hand much faster than the cloth, and thus seems coldest to the hand.

*Why does iron absorb heat more rapidly than cloth ?*

Because the iron is a better *conductor* of heat. The sense of touch, therefore, does not tell us the exact quantity of heat in every object.

*Can we blunt or abuse the sense of touch ?*

We can to a considerable degree. Persons in the constant practice of handling hot articles benumb the sense of touch to that degree that they can endure a great heat without inconvenience to themselves. This can also be done by artificial means. M. Chabert, a Frenchman, could by some process or application dip his hands into melted lead or boiling oil without any apparent injury to himself.

*Are some people more sensitive in their feelings than others ?*

Yes ; some are very *sensitive*, that is, have very quick, nice feelings ; others have but little ability to distinguish by feeling.

*Where is the sense of touch the keenest ?*

On the inside of the fingers, and very near their ends, where the ends of the nerves are collected into loops or coils, called *papillæ*. This sense is also very acute, in the palms of the hands, in the lips and tongue, and in the soles or under side of the feet.



*How are the blind enabled to read ?*

By passing the end of the second finger over letters raised a little from the page of books made for their particular use.

*What was the opinion of M. Buffon, the great naturalist ?*

He gave it as his opinion that the reason why one person knows more than another, is, that he has made a better use of his hands. Mr. Mudie, another naturalist, has truly said, that there is a mine of wealth in the ends of the fingers.

*May the sense of touch be greatly improved ?*

Yes ; the blind, who have to *see* with their fingers, can distinguish, it is said, the color of cloths, &c., by the sense of touch.



*How can this be satisfactorily explained?*

The color of a thing is supposed to affect the texture of its surface, and by a close attention with the fingers, to this texture, its color may be inferred.

*What organs have animals and insects that resemble the human fingers, in delicacy of feeling?*

The nose of some quadrupeds. The end of the elephant's trunk seems to be possessed of as acute a sense of feeling as the human fingers; and insects have this sense placed in little horns projecting from both sides of their heads, called *feelers*; with these they examine the surfaces over which they travel.

## LESSON NINTH.

### The Tongue, or the Sense of Taste.



*In what part of the mouth does the sense of taste chiefly lie?*

On the upper surface of the tongue. Branches of the nerve of taste, are also spread over the palate or roof of the mouth, and on the inside of the cheeks and lips.

*If we had no tongue, would all our food taste alike to us?*

Nearly so. To aid us in talking, is not the only use of the tongue. By its means we experience much of the gratification we enjoy, in eating and drinking. Nor are these all the uses of this very flexible, busy, little organ. We could not move the food in our mouths, so as to chew it thoroughly, nor could we swallow it, without the aid of the tongue.

*What is the appearance of that part of the tongue in which the sense of taste is situated?*

It is covered with numberless little loops, or doublings of the ends of the nervous threads, called papillæ, which rise above the surface, and give it the appearance of velvet.

*What is the condition of the tongue in health?*

It is always kept moist by the constant but moderate action of the saliva, commonly called spittle.

*What takes place in fevers?*

The tongue and mouth become dry and hard, the fluid, or saliva, not being there to moisten the parts.

*Why have we little or no taste when we are sick?*

Because the tongue is dry, and covered with a fur, or coat of scaly matter.

*Does this scaly, furry coat, cover up the nerves?*

It does; and this shows that the sense of taste resides chiefly in the papillæ or nerves of the tongue.

*Does great attention to what we eat and drink, lead us to neglect the mind?*

Yes; in two ways. It occupies time which might be much better employed, and produces tastes and habits unfavorable to both intellectual and moral improvement.

*May the sense of taste be abused and almost destroyed?*

We may greatly impair, if not wholly destroy, its power of discrimination, by the excessive use of spirituous liquors, tobacco, and other things to which it is naturally averse. Climates also affect the taste; in cold countries the most offensive oils are partaken of with relish; while in warmer countries, Asia and Africa, for instance, there are people who have a preference for putrid meats, stale eggs, &c., deeming them their most desirable food.

*How does the use of tobacco injure the taste?*

Tobacco belongs to the class of *poisonous plants*, and the papillæ of the tongue being habitually covered with its very sharp and irritating juice, gradually lose their sensibility. Spirituous liquors act precisely in the same way.

*Do all animals have the sense of taste?*

Yes; and in some of them it is keener than it is in man. Animals know what plants are poisonous to them by the sense of taste and smell, or by instinct; and most of them will avoid even the taste of tobacco or intoxicating liquors.

*How can we preserve this sense from injury, and in its natural state?*

By eating plain, nutritious food, and such only as is agreeable to us *at first*.

## LESSON TENTH.

### The Nose, or the Sense of Smell.



*In what part of the nose is the sense of smell placed?*

In the inside of the two passages of the nose called nostrils.

*What is the inner surface of each nostril lined with?*

With a thin membrane, over which the branches of the nerve of smell are spread, and which are kept constantly moist in their natural state with a thin fluid called *mucus*.

*What is the use of this thin fluid or mucus?*

It keeps the branches of the nerve of smell in perfect order, and protects them from harm. It also catches the odorous or noxious particles which are drawn into the nostrils with the air, and are thereby prevented from being carried deeper into the head where they would be an injury. By the act of sneezing these particles are ejected from the nostrils.

*If this fluid is not supplied what is the consequence?*

The nerve of smell receives no impression, and the sense of smell is suspended so long as the fluid is withheld.

*What destroys the mucus, or prevents the secretion of it?*

The use of snuff. Snuff-takers sometimes lose this sense wholly and irrecoverably.

*What other bad effect has snuff-taking?*

It injures the voice very much, by obstructing the passage of the air through the nostrils.

*If we hold a rose to the face, close the nose, and breathe only through the mouth, will an odor be perceived?*

No; the mouth can not smell any more than the eyes can hear, or the nose can see.

*How do objects communicate to us their smell or odor?*

By means of the minute particles which flow from them, as vapor passes off from water; these minute particles are drawn into the nose with the air we breathe.

*Can we see these minute particles?*

No; they are too minute to be visible to the eye.

*What animals usually have large nostrils?*

Those which are remarkable for the keenest sense of smell, like the deer, dog, &c.

## LESSON ELEVENTH.

### The Ear, or the Sense of Hearing.



*What makes sound?*

The jarring or vibration given to an object by striking it. If a bell is struck with a hammer, a trembling motion can be seen in the bell for a short time afterward. This tremulous motion is called *vibration* or sound.

*What has vibration to do with the production of sound?*

The quivering, trembling bell, gives numerous sudden strokes to the air, which is thus put in motion, causing sound.

*Describe the kind of motion which is thus given to the air.*

A circular waving motion. If a stone is dropped into a pool of still water, little waves or circles, one after the other, will run out in every direction. In the same way, when the bell quivers, numerous slight *waves* are made in the air. These waves are called vibrations, or undulations of the air.

*How do these vibrations convey the sense of sound to the brain?*

By striking against the *drum* of the ear. The sound from a musical wind-instrument reaches the ear in the same way. A flute or horn being blown into with energy, undulations or waves of the air are produced, which convey the sound to the drum of the ear, and thence it reaches the brain.

*What is the drum of the ear, and its construction?*

It is a very delicate, elastic membrane, spread across the inner end of the ear-passage, as the drum-head is stretched across the end of a drum.

*How far within the passage or ear-hole is this drum?*

About one inch.

*How is the passage to the drum guarded against the intrusion of insects, and the accumulation of dust?*

It is protected from injury by two methods; first, by a growth of short, stiff hairs, all along the entrance, standing up like a picketed fence, to keep out intruders; and, secondly, by a bitter wax, which is constantly secreted about the roots of these hairs, and which is offensive to all insects.

*When the drum of the ear is struck by the air being set in motion, how is the sound conveyed to the mind?*

The membrane vibrates in unison with the motion. These vibrations are communicated to the brain, through the nerves, and are thus perceived by the mind.

*Does anything else convey sound besides the air?*

Yes; water is even a better conductor of sound than air; that is, we can hear further through water than through air. Wood is also a good conductor of sound.

*How fast does sound travel through the air?*

Eleven hundred and fifty-two feet in a second, or a little more than a mile in five seconds, and nearly thirteen miles in a minute. Sound travels four times as fast in water as in air.

*Can hearing be much improved by cultivation?*

Yes, like all the other senses, it may be greatly improved.

How kindly and wisely the air is made. Its slight vibrations, reaching the ear, notify us of the neighborhood of objects and occurrences; the approach of danger, and of succor; and this, too, when darkness, or intervening object, do not

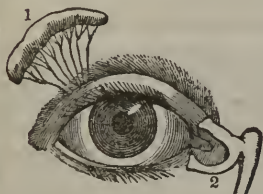


permit the eyes to see them; or, when the eyes are shut fast in sleep, it rouses us to wakefulness and circumspection.

Without air we could not breathe, nor would the blood have either health or warmth; our fuel would not burn, nor our lamps give light; without air, we could hold no converse with friends, or receive delight from "the concord of sweet sounds;" the murmur of the brooks would cease, the roar of the cataract would be hushed, and the "voice of Jehovah" in the thunder-storm would become mute for ever.

## LESSON TWELFTH.

### The Eye, or the Sense of Sight.



*What is necessary to the senses of touch, taste, and smell?*

The object must be present, to meet the skin, mouth, or nostrils.

*How does the sense of sight, differ from these three senses?*

By the sense of sight an object can be perceived at a greater or

less distance. It is not necessary that it should come in direct contact with the eye, in order to be seen.

*Is the eye, then, an organ of a higher order, and more ingenious in its construction, than the organs of the other senses?*

Yes, it is; and this sense contributes more to the enjoyment and happiness of mankind than any other of the senses. In its construction it exhibits the perfection of infinite knowledge. The utmost effort of human skill has as yet invented but an imperfect imitation of this organ.

*How can you describe the structure of the eye?*

The globe, or ball of the eye, has three coats or coverings around it, the same as a ball with three covers, and is placed in a deep bony socket in the skull.

*What is the little round dot in the centre of the eye called?*

The pupil of the eye, through which objects are visible.

*What is the color of the outside covering of the eye?*

White; this is what is called the "white of the eye." It is quite hard, and to it are fastened the muscles which move the eye in any direction desired by the will.

*What is spread over the inside of the middle covering of the eye?*

A layer of very dark colored matter, which absorbs and softens the rays of light, after they enter the eye.

*What is the third or innermost covering of the eye?*

It is a flattening out or expansion of the nerve which connects the eye with the brain, and is the immediate seat of sight.

*What is the use of these coverings and the fluids which they contain?*

To receive and properly refract the rays of light. All parts of the eye are constructed in such strict accordance with the laws of light, that it excels all other optical instruments in its perfection and accuracy.

*What does the picture upon the preceding page represent?*

It represents the eye. Above it is placed what is called the *lachrymal gland* (fig. 1), which continually pours out a watery fluid or tears, to moisten the ball of the eye, and keep it free from impurities. This fluid then passes off through the nasal duct or canal (fig. 2) into the nose, and thence it is ejected in the form of vapor with the breath.

*What is the cause of tears sometimes running down the cheeks?*

A stoppage in the nasal duct; or a sudden emotion or irritation will at times cause a greater flow of this fluid than will readily pass off through its natural channel, thus occasioning an overflow, which runs down the cheeks in the form of tears.

*Is a likeness or picture of everything, while it is being looked at, represented on the inner coat or pupil of the eye?*

Yes. A proof of this fact may be observed by looking closely into another person's eye, when you will see yourself pictured in it, the same as in a mirror when standing before it.



*What instrument resembles the eye in its operation, and how is it constructed?*

The telescope, which is designed to aid the eye in distinctly seeing objects at a distance. It is a long tube, with extension joints, to increase or diminish its length, and having glasses of a peculiar form, placed within and across it at vari-

able distances, to reflect and refract the rays of light from any distant point, so that the object will be pictured on the eye.

*What taught man to make such an instrument?*

The form and peculiar structure of the eye.

*When is a person said to be squint or cross eyed?*

When one eye is directed toward one object, while the other seems to be looking in a different direction; the muscles which move the eye are unequally contracted or weakened, so that they are not all subject to the will of the mind. A person who is squint or cross eyed sees an object with but one eye at the same time.

*How may this unequal contraction or weakness be remedied?*

Blindfolding the perfect eye, if either is straight, and allowing the person to look only through the imperfect one, which is usually weak, will often strengthen and restore it. It may also be remedied by cutting the muscle that prevents the eye from moving in the direction of the will.

*When the form of the eye is too round, what is the effect?*

The person is *near-sighted*, and can not distinguish distant objects clearly.

*What is a frequent cause of near-sightedness, and how may it be remedied?*

The habit of looking at objects placed at a short distance from the eyes, which may be overcome by an opposite practice, but the wearing of concave glasses is the usual remedy.

*Does the eye flatten as we grow older?*

Yes; and people near-sighted when young, can often see objects at a great distance when they are advanced in years.



*Why do aged people hold a book at a distance from their eyes when they read without spectacles?*

Because, as the eye grows flatter as it grows older, it can not distinctly see objects that are very near. This is called *long-sightedness*, and may be remedied by the use of convex glasses.

*What class of men train their eyes to see at a great distance?*

Seamen, by constantly looking at far-distant objects.

*What will be the effect of fixing the eye for a time upon some distant object?*

There will be a painful sensation in the eye similar to that experienced by other muscles of the body when used too long; this is called "straining the eyes."

*Do all animals and insects have eyes?*



All animals have eyes, but a few insects have none, while others have a great number. The ant has fifty, the beetle has three thousand, the silk-worm-moth six thousand, the dragon-fly twelve thousand, and the microscope shows that others have as many as twenty thousand eyes or more.

*What does the picture represent?*

It represents a front view of the head of a bee, highly magnified, showing the great number of eyes it has. Each hexagon in the picture represents an eye.

*What is the probable reason of their having so many eyes?*

It may be because they have no muscles with which to move the eye, and thus they need a great number of extremely small ones to enable them to see in every direction at the same moment. All these eyes may, moreover, be necessary to help them find food, and to warn them of danger.

*Why have we but two eyes?*

Our eyes being moveable, we are enabled to look in many directions; therefore, a larger number is not necessary.

*What is the use of eyebrows?*

They are designed to turn away the sweat of the forehead, and, aided by the eyelashes, prevent its getting into the eyes.

*What is the use of the eyelids?*

They keep the eyes moistened, and wash off, every time the eyelids wink, all the dust which may settle on the eyes. Besides they protect the eye from an exposure to dust, wind, or a too strong and sudden light, which not unfrequently is the cause of inflammation of the eyes. The eye is the most delicate of the organs of sense, and is more liable to injury and disease than any of the other senses.

*How may we prevent disease and strengthen the eyes?*

Diseases of the eye may be prevented by a careful regard to their strength, by refraining from their use in improper light, and by affording them rest as soon as a sense of fatigue begins to be experienced. Washing them in pure, cold water at bed-time, and a liberal bathing on rising in the morning, will be found of great service in promoting strength and vigor.

*What should be done when particles of dust get in the eyes?*

The dust should be removed at once by the mildest means, to avoid inflaming the eyes. Eye-stones should never be employed, as they often cause more pain and irritation than the evil they were intended to remedy.

*Are there any persons who can not distinguish one color from another?*

Yes; some persons can not separate any of the colors, while others are unable to distinguish some one or more, like green from blue, but can readily discern the rest.

*Which of the five senses are most important in relation to the mind?*

Seeing and hearing are obviously the most precious, as means of acquiring knowledge, and promoting mental improvement. The enjoyments furnished by the senses of seeing and hearing, take a far wider range, and are of a far nobler nature, than those of the other senses, which seem to be more directly useful to the body than to the mind. The interesting yet almost senseless little creature, Laura Bridge-



man, an inmate of the Boston Institution for the Education of the Blind, from her birth has been able neither to see, hear, speak, nor smell, but makes her wants known and holds converse with her teachers, through the sense of feeling only, and is happy and thankful for this one !

How wise, good, and ALL-SEEING, must be the Creator, who made the eye, so perfect, so beautiful, and so wonderful ! And we should never abuse this nicely-made and delicate instrument by straining it, in looking too long at one object, or by using it when there is not sufficient light to see properly.

Neither should we neglect a proper care of all the senses with which we are endowed ; for a deprivation of any of them is one of the greatest misfortunes that can befall us.

### LESSON THIRTEENTH.

#### The Heart, or the Circulation of the Blood.

*Is the blood always rapidly circulating through the body ?*

It is. The instant the blood stops moving we faint away.

*What makes the blood keep constantly circulating through the body ?*

The action of the heart is thought to be the chief if not the only cause.

*Can you feel this action of the heart ?*

Yes ; by putting the hand on the left breast, and by the beating or throbs of what is called the *pulse*, in the wrist.

*What conveys the blood out from the heart through the system ?*

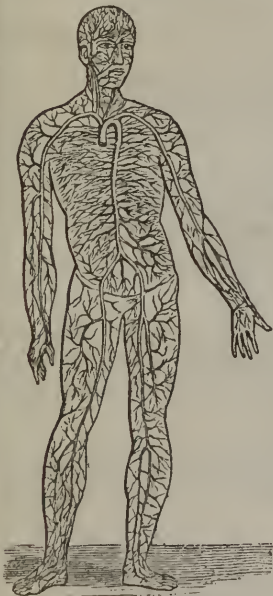
The *arteries*. These are large and small pipes running into and through every part of the body, as represented in the picture.

*What brings back the blood again into the heart ?*

The *veins*, which may be seen through the skin on the body.

*What is the color of the blood when it comes back through the veins ?*

Black and thick, from collecting and bringing with it in its course back to the heart all the impurities of the blood.



The Arterial System.

*Why does the blood return to the heart?*

To be sent by it into the lungs, to be purified.

*How often does all the blood make a circuit through the system?*

This depends wholly upon the health or condition of the person. Once in from three to eight minutes, all, or at least an amount equal in weight to all, the blood in a human body flows from the heart through the arteries to the extremities of the system, and then back again through the veins into the heart and lungs, to be purified.

*How much blood is there in an adult or full-grown person?*

From thirty to forty pounds, or from four to five gallons.

*How many pounds of blood pass through the heart every twenty-four hours?*

About sixteen thousand pounds, or eight tons, which is more than the weight of a hundred men, and more than seventy barrels in measure!

*What is meant by the beating or throbbing of the heart?*

What we call the "beating of the heart" is its action to throw out the blood into the system. Each beat or throb expels from the heart in this way about two ounces of blood.

*What may be said of the rapid circulation of the blood?*

The faster it circulates, beyond what is natural in health, the sooner it will wear out the body.

*What injurious effect results from drinking spirituous liquors?*

It excites and increases the action of the heart.

*Does it not follow then, that the habitual use of wine, spirits, or even of beer and cider, will shorten life?*

It certainly does. Drinking alcoholic liquors throws the whole system into an excited and destructive action.

*With a temperate and healthy man, how often does the heart beat?*

Some seventy times in a minute, or more than one hundred thousand times in twenty-four hours!

*Does exercise promote the circulation of the blood?*

It does; and a regular exercise of the muscular system is necessary, to keep up a vigorous circulation of the blood to the extremities of the fingers and toes, and also to maintain a healthy condition of the system.

*Should all kinds of clothing be loosely worn?*

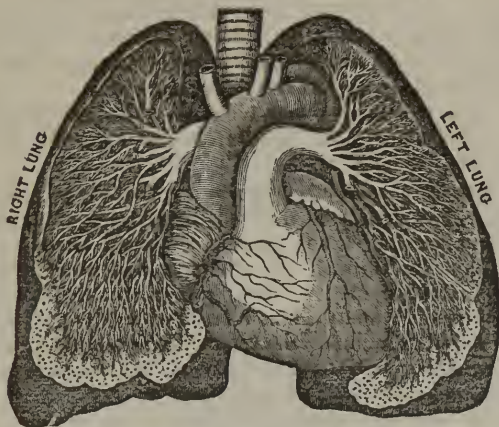
Yes; all articles of apparel should be worn loosely, so as to permit a free circulation of blood through every organ, to the very extremities of the body.

*What is the best stimulant when the extremities are cold and chilly?*

Exercise in the open air, or an application of cold water followed by a brisk rubbing with a coarse towel.

## LESSON FOURTEENTH.

## Breathing, or the Heart and Lungs.



The Heart, Lungs, and Windpipe, in their natural Position.

*Where are the heart and lungs located?*

They are placed within the chest, at the upper end of the trunk, where they are protected by the ribs or "bones of the chest," (see page 12.) These organs are exceedingly delicate in their structure, and will not bear with impunity any exposure to external injury.

*Of what advantage is breathing, and why does it keep us alive?*

By breathing we draw in *air*, which purifies the blood, and prepares it for nourishing and sustaining the body, and the refuse matter which it separates from the blood is carried out.

*Into what organ does the air enter when we inhale or breathe it?*

Into the lungs where its gases come in contact with the blood, impure from having circulated through the body. The gases of the air purify this blood, which immediately after passes again through the body to return in like manner.

*What conducts the blood into the lungs?*

Small vessels or tubes are continually pouring impure blood into the lungs from the heart, while others are carrying it back again into the heart after it is purified.

*What is the cause of the impurity of the blood?*

As the blood passes through the body, it gathers up the decayed and waste particles or atoms, and in this way it becomes impure. It then returns to the lungs to be purified,

and thus made fit again to go out into the system, to perform its life-preserving work anew.

*What are the lungs that purify the blood by means of the air?*

They are the bellows, or breathing organs of the body, and are composed of a soft, fleshy substance, full of small air-cells and tubes, similar to a sponge or a honey-comb.

*How many lungs have we, and how are they situated?*

We have two lungs; one lying on the right side of the heart, called the "right lung," the other upon the left side, called "the left lung."

*What is breathing, and how may the process of breathing be explained?*

It is, as has already been stated, the drawing of air into the lungs, and pressing it out again in continued changes. The air is drawn in through the windpipe, and along the tubes into the cells of the lungs, swelling them out, and causing the chest to expand; and then, as it sinks or contracts, the air, or a watery vapor containing the impurities of the blood, is pressed out again through the same passage, into the atmosphere.

*By what process does the air purify the blood?*

The air consists mainly of two gases; the principal one is called *oxygen*, and the other *nitrogen*. The oxygen gas combines with the waste substances or particles in the blood called *carbon* and *hydrogen*, producing what is termed *carbonic acid gas*, which is expelled or breathed out from the lungs when the chest contracts. The oxygen by this process changes the "venous" or impure blood from a dark color to one of bright scarlet or "arterial blood."\*

*Is the carbonic gas thus ejected from the lungs, fit to be breathed again?*

By no means; it is very poisonous, and if much of it is inhaled again, it causes sickness and destroys life.

*Why should school-rooms, churches, and all public buildings, have a free circulation of fresh air into and out of them?*

The oxygen of the air in the room is soon consumed by the breathing of the scholars, or large assemblage of persons, and carbonic acid gas is left in its place. Air, therefore, should

\* The nature of the different gases may properly be explained here.

*Carbon* is an elementary combustible substance. But for the existence of this substance in wood and coal they would not burn.

*Hydrogen* is a gas which constitutes one of the elements of water and is highly inflammable or easily set on fire.

*Oxygen* is the principal component part of water, the vital part of the air in sustaining animal life, and the supporter of ordinary combustion.

*Nitrogen* is the principal component part of the air that we breathe, yet animals can not live in it alone, while it is the living principle of the vegetable kingdom.



pass in and out freely, both to supply more oxygen, and to drive off the poisonous carbonic acid gas.

*Is not this just as true of private dwellings and work-shops?*

Yes; all rooms in which people sit, or pursue their labors by day, as well as those in which they sleep at night, should be kept well ventilated, so that the air they have already breathed may pass out, and pure fresh air be freely admitted.

*Is it not also true that light is next in importance to air?*

Yes; light should be perfect and abundant, as it is important to the health and good color of both plants and animals. Children or adults, like plants, if confined too much in dark and badly-ventilated rooms, will be pale and sickly.

*Should sick-rooms be well ventilated for the benefit of the patient?*

It is a too common practice to exclude fresh air from a sick-room, from a fear that the patient will take cold. In fevers or inflammatory diseases let the patient breathe freely of pure air (avoiding draughts or currents of air), for the purer the blood the greater will be the power of the system to overcome the disease, and the less the liability of taking cold.

*What are lung diseases, and how are the lungs affected?*

In health the lungs are exceeding porous and spongy, but in some diseases they become nearly or quite one solid mass. In consumption the tubes and cells are to some extent closed with tubercles or abscesses of putrid or corrupt matter, and sometimes the whole substance of the lungs is filled in this way, leaving but little or no room for the air to be breathed into them. Death soon ensues in such cases from the lack of air to purify the blood and nourish the system.

*When are the diseases of the lungs most prevalent?*

Diseases of the lungs prevail the most during the months when and in localities where the weather is most changeable, but diminish as the temperature becomes more uniform.

*How may the diseases of the lungs be guarded against?*

To prevent diseases of the lungs, constant care should be exercised to keep the heat of the body as uniform as possible, and to avoid sudden exposure to cold air, when the system is unnaturally excited, and the pores of the skin are relaxed and open, or in other words, when we feel "*warm and sweaty.*" The clothing during winter should be sufficient to protect the body against sudden changes of the atmosphere, and it should not be exchanged too early for summer apparel. It is better to suffer a little inconvenience in the spring from excessive clothing, than to risk injury to the lungs by making the change prematurely.

## LESSON FIFTEENTH.

## Animal Heat, or Warmth of the Body.



Food supplies fuel for the heat of animal bodies—Coal the fuel for heat in Furnaces.

*Is the true cause of heat in animal bodies generally understood?*

It is not. The true source of animal heat is still but imperfectly known. There have been many conjectures and conclusions put forth, but we have no means of determining the truth of any of them. The action of the air upon the blood in breathing, the circulation of the fluids of the body, but more especially the blood and the action of the nervous system, may all tend to produce heat.

*In what way may these be supposed to cause the heat of the body?*

The part of the air called oxygen uniting or mingling with the carbon of the blood may produce heat, the same as heat is produced by mingling water with unslaked lime. Again, the rapid circulation of the blood and other fluids through the system, may cause the heat from friction, the same as when two pieces of wood are rubbed together they soon become warm. These are but conjectures for which we have no positive foundation.

*What is the latest conclusion of physiologists upon this subject?*

Physiologists of the present day very generally agree that the heat of the body is caused by the slow combustion or decomposition of the old and waste particles of flesh and other component parts of the system, which it is evident is constantly going on through the circulation of the blood.

*How may this conclusion be satisfactorily explained?*

We have before stated that during life the body is continually decaying, and a new body is being formed to take its place. The food that we eat adds new material to the blood. This new material is carried with the blood in its circuit through the system and is deposited wherever it may be needed. The waste or dead particles, or those which have finished their work, are received into the blood, and their pla-

ces occupied with new ones fresh with living vigor. These rejected particles or atoms contain more or less of carbon and hydrogen, which, coming in contact with the oxygen in the air, received into the blood through the process of breathing, are thereby consumed, producing and generating a general heat throughout the system. This work of interchange of particles, and the burning up of the old flesh, is carried on throughout the body; consequently every part of it is warmed.

*Do all the waste particles, or rejected matters, pass into the blood to be sent out of the system through the lungs?*

No, much of the waste of the body escapes through the pores of the skin, in the form of a watery vapor, or as it is called "insensible perspiration."

*Is the natural heat of animal bodies the same in all temperatures?*

Yes, whether in the icy regions of the polar circles, or in the burning zones of the tropics, the internal warmth of the body, when in health, remains always the same.

*What is the natural heat of the human body?*

The usual standard of heat in man is ninety-eight degrees of Fahrenheit's thermometer.

*How warm should a room be in winter to make it comfortable to live in?*

From sixty-five to seventy degrees.

*How warm is it in the shade in a very hot day in summer?*

Seldom more than from ninety to ninety-five degrees. Therefore it is very evident that the heat of the body is warmer than the atmosphere of a hot day or of a heated room. It is also evident that the heat of the body is not derived from external objects, and certainly not from the atmosphere, for we know that our bodies are warm when the air is extremely cold; nor from the sun or fire, for our bodies are warm in the absence of both.

*May we then conclude that there is no additional heat imparted to the body from our clothing, let it be what it may, whether cotton, woolen, or furs?*

Yes; for our clothing has no actual power of giving heat, it has no warmth in itself; it keeps a warm body warm, and a cool body cool, but of itself it neither creates nor gives heat. If in summer you wrap a piece of ice in flannel it keeps it from melting. Clothing only prevents the passage of heat from within or the cold from without. If then animal heat is not obtained from any outward source it must originate within the body.

*How is the heat of the body controlled and kept at its regular temperature?*

The surplus heat of the body passes off through the pores of the skin, and by evaporation from the lungs. The quan-

tity which thus escapes is regulated by the temperature of the air and the state of the atmosphere. In warm and dry weather a greater amount of heat passes off than in damp and warm or cold and frosty weather.

*Is the internal heat of the body greater in winter than in summer ?*

Yes. By a wise adaptation of Nature's supply to her wants, the animal body is kept cool in the summer and warm in the winter. In the winter we have a greater appetite and desire for animal food, which supplies more carbon and hydrogen or combustible material, and the increased density of the air furnishes more oxygen; consequently a greater heat is maintained; but in warm weather a vegetable diet, which gives less fuel, satisfies our desires and appetites, and the atmosphere affords less oxygen for the support of the combustion.

*Upon what does the amount of fuel consumed and heat generated depend ?*

They depend mostly upon the quality of the air breathed into the lungs, the healthy or diseased condition of the lungs, the age of the individual, exercise of the body, the condition of the brain, the skin, and the general system.

*Does exercise increase the heat of the body and the consumption of fuel ?*

It certainly does. We know, from experience, that our bodies are warmer during exercise, and our desire and appetite for food greater, than when we are at ease or unemployed.

*Is the heat of the body the same during sleep as when awake ?*

No, it is not. During sleep when the brain is partially inactive, less heat is generated; and for this reason, we need more covering to our bodies to be comfortable than we require while awake.

*Do young or aged persons generate the most heat in their bodies ?*

Young persons. It may be because the circulation of the blood and other fluids are more rapid in young persons than in aged ones, or that the period when all the parts of the system are growing more heat may be required in order to make the circulation more rapid, for it is through the circulation of the blood that the material is carried to build up the body, the same as brick and mortar are carried to build up a house.

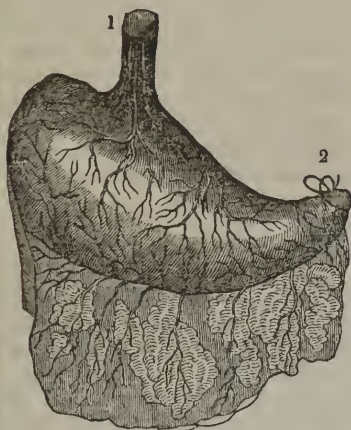
*Why does a person become almost cold before death ?*

Because the vital organs, the circulation of the blood, the breathing, and the nervous system, have almost ceased to perform their functions; or, that the circulation, breathing, and action of the nerves, have ceased, because the vital heat is no longer supplied. The effect of this suspension of vital action is first felt at the extremities, the coldness gradually progressing toward the region of the heart.



## LESSON SIXTEENTH.

## The Stomach ; or Food and its Digestion.



The Human Stomach.

*From what is our blood made ?*

It is made from the food which we eat and drink.

*What is the stomach ?*

It is a large pouch or sack into which the food passes after leaving the mouth, and where it is digested. (See the picture of the stomach—fig. 1, the passage into the stomach ; fig. 2, the point at which the food passes out after it is digested.)

*How is the food changed or converted into blood ?*

The food while in the stomach, becomes dissolved or digested, the same as sugar is dissolved in tea or coffee. It is then called *chyme* ; this passes out of the stomach into what is termed the “*duodenum* or intestines,” where it is then separated into two classes, a milky fluid called *chyle*, or the part which enters into and forms the life of the blood, and the waste or useless part, which should be ejected from the body regularly each morning soon after rising.

*What turns chyle into and gives it the color of blood ?*

It is not positively known ; but from the course it takes it is probable that it is converted into blood when it mingles with the blood already formed in the veins, and receives its color when it comes in contact with the oxygen of the air.

*What digests or dissolves the food in the stomach ?*

A very powerful fluid contained in the coat or lining of the stomach, called *gastric juice*. The digestive process which effects so great a change in the food is as wonderful as it is interesting. Every kind of food, no matter what its character may be, whether vegetable or animal, is dissolved into one and the same fluid. It was at first the food of the stomach ; it is now the nutriment or vital part of the blood.

*What prevents the food from escaping from the stomach while in a state of digestion ?*

At the point or outward passage of the stomach there is a



Fig. 1. The Stomach.  
 Fig. 2. The Duodenum.  
 Fig. 3. The Intestines.  
 Fig. 4. The Rectum, or passage for  
 the waste matter out of the body.

strong band of muscular fibers which, by contraction, completely closes the opening, the same as a string tied around the mouth of a bag, and thus retains the contents of the stomach, while undergoing the process of digestion. If the contents were not thus secured, the motions of the stomach and the respiratory muscles would force the food out prematurely.

*What other duty is performed by this contracting band of muscular fibers?*

This ever-watchful door-keeper not only retains the food in the stomach until it is properly digested, but also prevents the indigestible matter, or that which will not readily digest, from passing out, so long as it can be retained, or until it is compelled to let it pass.

*Of what does this indigestible matter consist?*

We sometimes eat food of a kind which the stomach can not digest, and sometimes we eat more at a meal than the gastric juice can dissolve; or that which has been eaten may not have been properly masticated in the mouth.

In these instances the stomach digests what it can, and makes a great effort to digest the rest, or to send it out undigested, which it finally accomplishes. It is while these struggles are going on that we feel a distressing oppression about the right side just below the short ribs.

*What is the cause of "a distress in the stomach," as it is called?*

It is the retention of the indigestible matter, and the effort of the stomach to dissolve it, that causes the headache and the distressing oppression experienced in the region of the stomach some two or three hours after meals, and to relieve which the doctor is often applied to, or in his stead nostrums and "certain cures" of various kinds are swallowed.

*What class of persons digest food the most readily?*

Those who have not abused their digestive organs;—who have not overloaded them, nor tasked them with indigestible

substances. Those who exercise freely in the open air; who sit, sleep, and work, in well-ventilated rooms; who keep a clean skin; who have a cheerful and contented mind, and who lead an honest and industrious life.

*Do not some articles of food digest more readily and quicker than others?*

Yes. But there is, however, a considerable difference in this respect. It is too commonly supposed that the food, which people in ordinary health digest soonest, is, for that reason only, the most wholesome, and the *lightest*, as it is termed. But these are erroneous conclusions.

*What is generally considered as "light" or "heavy" food?*

The terms "light" and "heavy," as applied to food, are suggested by its effects on the feelings of those who eat it; and, in this sense, they are sufficiently accurate. These effects, however, do not depend merely upon their readiness or difficulty of digestion; but partly, if not wholly, upon the influence of the food on the *circulation* of the fluids of the body.

*Does animal or vegetable food digest the more readily?*

Vegetable food, of most kinds, digests more slowly than animal food; but for persons in ordinary health, it is usually deemed lighter than meat: that is, it leaves them more clear-headed and tranquil, because it is generally much less stimulating and heating. Besides, all the digestive organs require some degree of distension, for the better performance of their functions; and food, therefore, should not consist merely of aliment, or be capable of being wholly converted into chyle.

*What rule, then, should we follow in deciding what food is best for us?*

The best general rule, for persons in ordinary health, is, probably, to observe their most favorable feelings after eating; for, if they are not conclusive evidence of quickness of digestion, they are still good evidence of the wholesomeness of food. The *kind* of food, however, is not so material as its condition and quality, and the quantity eaten at each meal.

*Does the eating of food hastily, or over-eating, produce any ill effect?*

Yes. Our food should be eaten quite moderately, and be well masticated in the mouth, before it is swallowed; otherwise an oppressive weight and oftentimes pain will for some time afterward be felt in the stomach. The same feelings will be experienced when we have eaten too much, or have eaten that which does not readily digest, which must in a greater or less degree injure the digestive organs.

*Should drinks of any kind be taken into the stomach at our meals?*

No; for they retard rather than assist digestion. The fluids or secretions of the mouth and stomach are all-sufficient

for the purposes designed, and these are weakened and less active by the addition of other fluids. For the same reason broths and soups are objectionable.

*Is ice or very cold water prejudicial when taken with our meals?*

Yes; for digestion is suspended until the heat of the body or stomach shall have equalized the temperature of the ice or cold drinks to that of the stomach.

*When may ice or very cold water be taken with impunity?*

In cases of fever or inflammation *when the stomach is at rest*. Pulverized ice swallowed into the stomach at stated intervals is highly beneficial in a feverish or inflamed state of the system, as it reduces the heat of the blood; and for the same reason the breathing of pure fresh air is also beneficial. In such cases, the food should be of the simplest kind, and the quantity limited. Patients are greatly relieved and soon recover under such treatment, where an opposite course has sent very many to an early grave.

*At what times of the day should we take our morning and mid-day meals?*

Breakfast should be eaten within one hour after rising from our beds. This applies more especially to invalids, who have but little strength or power of endurance. We are better able to resist the influences of cold, and to keep up the natural heat of the body, when we are full than when fasting. In about five or six hours after the morning meal the appetite returns, and the system calls for more nourishment; this is then the true guide for the hour of dining.

*At what time should we take our supper or evening meal?*

Supper should be eaten at least three hours before retiring to rest, that this meal may be well digested before sleep; otherwise the sleep will be disturbed by distressing and oppressive dreams, and the body and mind will not be refreshed by sleep for the following day's labor. Our meals should be eaten at the same hours from day to day.

*Should anything be eaten between these several meals?*

No. With the exception of a little water, nothing should go down our throats between meals, and not even water until two hours shall have elapsed from the time of eating. The reason is obvious. The stomach requires rest, and rest it must have if expected to perform its work properly.

*May we not eat an apple, or a little fruit, or a few nuts, between meals?*

The answer is still, *No!* These may be eaten with our meals, but not between them as a general rule. Every housekeeper knows how very annoying it is, when she has cleaned up after a regular meal, to be called upon to go through



a similar operation between meals. The stomach is as sensitive of annoyance as the feelings of the housekeeper.

*Are not children's appetites tampered with ?*

Yes, to an alarming extent. Mothers have much to answer for in relation to this question. Children are trained from their infancy to be gluttonous. No matter if they have filled their little stomachs but ten minutes before, if they but cry the same remedy is applied, and applied as often as the cry is repeated ; sometimes they get so full as to vomit—*literally to run over*. By this early habit of overfeeding, the stomach becomes enlarged, distended, and weakened ; and in after-life if dyspepsia or indigestion does not prove to be the sad result it will only be because human nature is tough and can endure the trespass of youthful indiscretion.

*Does cheerful conversation during meals assist digestion ?*

It does. During the time of eating, the body should be seated in a comfortable and easy position. The mind should be quite free from care and anxiety. None of the evil passions should ever be allowed to come to the table, but in their stead, permit the lively play of the social affections, and the pleasant intercourse of family and friends, to keep the brain in action but not in labor.

*Of what advantage is cheerful conversation during meals ?*

It causes the blood to move more freely, and all parts of the system to be at ease and free from restraint. The lively flow of spirits will aid the digestive process, which will the more readily begin, and be the more easily carried on. The solemn stillness that reigns over the tables of some families, the unbroken quietness which a stern but mistaken discipline pursues and imposes upon some children, is at variance with their best interests.

*Should we flee to a doctor or to drugs and medicine for every ail, ache, and pain, that we may have ?*

No ; for if we but act promptly we have under our control a preventive and a cure for nearly or quite every ill that "flesh is heir to," and this too "without money and without price." It is the delay to act which gives rise to the necessity for a doctor. Nearly all of our aches and ails proceed from the foul condition of the stomach, because there are matters there which do not readily pass off ; and it is into the stomach that medicines are sent for the cure of these troubles. Headaches and other painful sensations in the head proceed from the same cause, and it is only through the stomach that the relief or remedy can be applied.

*From what source may a very instructive lesson be learned?*

We may learn a very instructive lesson from the cat, dog, and other animals. They do not send for the doctor when they are ill; but follow the teachings of their own natural instinct. Who has not observed that when ill they will not eat, but *fast, sleep*, and soon after recover. A very eminent physician upon his death-bed said, "I shall leave behind me three greater physicians than myself." Upon being asked who they were, replied, "Air, Exercise, and Diet."

## LESSON SEVENTEENTH.

### Physiology of the Teeth.



*Are the teeth, like all our other bones, made from our food?*

They are; and like the other bones, consist chiefly of lime, but unlike our other bones, are exposed to the immediate action of the air and foreign substances.

*In what respect do they differ from the other bones of the human frame?*

They are composed of a much harder material. The internal part, or the ivory of the teeth, is a more solid substance than bone, and this is covered with a smooth, white, and still harder substance, called *enamel*, which when once decayed or destroyed is never again restored.

*What is the use of this enamel?*

It gives the teeth strength, as well as hardness, for biting, chewing, and grinding the food; it also prevents injury from these operations, and from the action of acids on the bone of the teeth; and while the enamel renders these important services, it adds much to their beauty and durability.

*Are the teeth supplied, like the other bones, with blood-vessels and nerves?*

They are, and as most people have occasion to know, are endowed with life, and also an exquisite sensibility, which is the more apparent when they become decayed.



Side View of the Under Jaw and Teeth.

*How many parts are there to a tooth?*

Three parts : called the crown, the neck, and the root. The crown is that part which rises out of the jaw, and which is seen, the neck is that portion clasped by the upper rim of the socket ; and the root is that part within the gum and socket, which is fastened to the jawbone.

*How many teeth has a young child, and what care is necessary?*

Twenty ; ten of them in the upper, and ten in the lower jaw. When a child becomes six or seven years of age, the teeth loosen, and, if they do not drop out, they should be removed without delay, otherwise they will prevent the proper formation and regularity of the new permanent teeth, which are growing under them. (See the picture, letter A, showing the position of the new teeth in the under or moveable jaw.)

*How many teeth has a grown person, when the set of teeth is perfect?*

Thirty-two ; or sixteen in each under and upper jaw.

*How many different kinds of teeth have we?*

Three: the *cutters*, or front teeth ; the *pointers*, or eye-teeth ; and the *grinders*, or back, double teeth.

*How many are there of each kind?*

In each jaw there are four front teeth, two eye-teeth, and ten grinders ; one half of them on each side of the face.

*What is the most important use of the teeth?*

Their leading and most important use is to cut and chew, or grind the food so finely that it may be mixed with the saliva, or the moisture of the mouth, and then swallowed, or passed into the stomach. This is the first step in preparing food for digestion and nourishment.

*If we had no teeth, would we have the pleasure in eating we now enjoy?*

We would not ; for the only food which we could then take would be liquids, or pap, such as young children feed upon.

*Are the teeth useful in any other way?*

Yes ; they assist the voice in talking, reading aloud, and singing. If a person loses two or three front teeth, he talks, reads, and sings, in a hissing manner, which is called *lisping*. The loss of teeth also prevent a person from giving the correct sounds to many letters, and from articulating distinctly.

*Should we not do everything in our power to preserve our teeth ?*

Yes ; for perfect teeth are ornamental as well as useful. We should never pick nor scratch them with pins or pocket-knives ; for these break the enamel or their brilliant pearly covering, and when this is once broken they soon begin to decay. Quill or wooden toothpicks may be useful in removing any particles of food that may not be readily reached by the brush, but metallic toothpicks should never be used.

*Is there any other way in which the teeth may be injured ?*

There is ; taking into the mouth food or drink, which is either too hot or too cold, and the habit of smoking or of chewing tobacco, which burns out and destroys the teeth. The practice of cracking nuts, or of biting thread, or of lifting heavy bodies with the teeth, are very injurious to them ; acid drinks and fruit that set the teeth on edge are also injurious.

*Why are the teeth of Europeans generally better than those of Americans ?*

The principal reason is, their food is more simple, and their habits more temperate and uniform, than those of Americans.

*Can we preserve our teeth many years unless we keep them always clean ?*

No. The teeth should be cleansed with a brush or soft piece of flannel and tepid or lukewarm water, after every meal, but more especially before retiring to rest, and again after rising in the morning. Some fine tooth-powder or refined soap may be occasionally used, to remove any corroding substance that may exist around or between the teeth, care being taken to thoroughly rinse the mouth after its use.

*What is the cause of the pain called "toothache" ?*

When a tooth is decayed, and its nerve is diseased and inflamed, its exposure to the air causes the ache or pain which we feel ; and when eating, some of the food is pressed against the inflamed nerve, which also produces the painful sensation, commonly called "the toothache."

*When a tooth is too much decayed to be preserved what should be done ?*

It should be taken out without any delay ; because its presence not only contaminates the breath, making it disagreeable, but its presence is an injury to the other teeth, by causing them also to decay. This applies to teeth that are decayed beyond a remedy. It is not necessary to have teeth extracted simply because they ache, for the nerve of the root may be diseased and still the tooth be sound. In such cases the disease may be remedied by proper medical advice. Many a tooth, through ignorance, has been removed unnecessarily.

*What is the cause of the premature decay of the teeth ?*

Some kinds of medicine may be the cause of more or less



injury to the teeth, but they injure the stomach first. The great leading cause of the premature decay of the teeth arises from their *disuse*. Some persons hardly use their teeth sufficiently to keep them clean. The more the teeth are regularly and properly used for the purposes they were intended, that of masticating and preparing the food for the stomach, the more healthy they will be, and the less the liability to decay.

*Who have sound and who have decayed or diseased teeth?*

Healthy persons generally have sound teeth, while feeble sickly people have decayed or diseased ones, for the reason that the teeth are more or less affected by the healthy or diseased condition of the stomach. Therefore all should try to observe the few simple rules that are laid down for the promotion of health.

*If a person wishes to have a sweet breath, of what must he be careful?*

Of his teeth, his stomach, and his lungs. The breaths of some persons are pleasant, some are offensive, while others are without any perceptible odor; still there are those whose breaths are so very powerful as to taint the air of a whole room. These disagreeable breaths proceed from various causes; decayed teeth, disease of the lungs or air passages, but more commonly from the direct secretions in the lungs, as when, for instance, onions or garlic have been eaten, tobacco smoked or chewed, or when any kinds of spirituous liquors have been taken into the stomach.

## LESSON EIGHTEENTH.

The Human Throat, or the Voice.



*What class of persons have strong, powerful, and melodious voices?*

They whose lungs are healthy, or not diseased, who have cultivated a full chest, and an erect position; who give their lungs free action by wearing their clothes loosely around the chest and neck; and they who daily exercise their lungs. Sailors, smiths, and others engaged in noisy occupations, exert their vocal organs more strongly and therefore their voices

are with less effort louder and clearer than those engaged in more quiet occupations.

*In what part of the human throat is the voice formed ?*

The upper part, by means of fourteen pairs of muscles.

*How many clear, distinct tones of voice can a person make ?*

At least fourteen ; and, by practice, perhaps several more. The human throat by proper cultivation is capable of being made the most perfect musical instrument yet known in nature or art.

*Are people generally good performers on this instrument ?*

No ; only a very few cultivate the voice as they should ; the greater part of mankind bestow no care upon it whatever, and employ but two or three of its tones during their lives.

*Is not a variety of tones, in speaking or reading, as pleasing to the ear as a variety of notes in singing or music ?*

Yes ; and it is the duty of every one to obtain more power over the voice, not only by singing, but by the daily practice of both reading and speaking, on different keys, and in various tones.

*Should not singing be taught as a regular exercise in every school ?*

Yes. In the schools of Germany it is, and more recently in some of the schools in the United States it has become, a part of the regular established course of instruction.

*What favorable effect is noticed in the Germans as the result ?*

The Germans are noted for being a healthy and cheerful nation. Consumption or lung diseases are seldom known, and it is believed that their practice of singing, united with their outdoor exercises, is the main preventive. And this is probable, for the regular exercise of the lungs and the vocal organs, as well as of all the other parts of the body, develops and promotes their vigorous and healthy action.

*Is it a general belief that singing has an influence on the moral character ?*

Yes, and a very favorable one, especially when pursued at an early period of life. This conclusion has been fully and satisfactorily sustained by experience.

*But may not music or singing sometimes exert a corrupting influence ?*

Undoubtedly it may, especially vocal music. But any of the good gifts of God may be, and are sometimes, perverted and abused. This, however, is but a very poor reason for omitting to use them at all.

*What are the German proverbs in relation to singing ?*

The German enthusiasm for singing is expressed by two proverbs, which read thus : "Where singing is not, the devil enters," and "Singing is the gymnastics of the affections."

*How may we know when music or singing is rightly employed?*

When it warms the domestic and social sympathies; but its most exalted service is to lift the heart in love, gratitude, and reverence, to HIM "from whom cometh every good and perfect gift."

*For the free exercise of the voice should anything be tight around the neck?*

No. The dress of the neck, particularly of public speakers and singers, should be quite loose and thin to prevent too great a flow of blood to the vocal organs when exercised.

*To guard against sore throats and coughs what great error is committed?*

The practice of bundling up the neck to guard against sore throats and coughs is very erroneous, for, instead of warding these off, it is oftentimes their direct cause. It is the extremities of the body that need extra protection, and not the head nor the neck. It is better to accustom these parts of the body to exposure, and when coughs, sore throats, or a cold in the head occurs, a little extra covering to the neck and throat is all that will be required for their remedy.

*By what other practice or habit are the affections of the throat caused?*

By the habit which some persons have of breathing through their mouth instead of through their nostrils. Children should never be allowed to contract this habit, neither in standing, walking, nor sleeping; for, besides the vacant appearance it gives to the countenance, it is the almost certain precursor of coughs, colds, and sore throats. The nostrils or nasal organs are clearly the medium through which respiration was designed by our Creator to be carried on. "God breathed into man's nostrils the breath of life," previous to his becoming a living creature.

*What is the real origin of almost all the diseases of the throat, lungs, &c.?*

Almost all the diseases of the throat and lungs, such as bronchitis, asthma, and even consumption itself, originate from this unnatural habit of neglecting to keep the lips closed when not engaged in conversation, or otherwise occupied. The excessive perspiration, or "night sweats," to which some persons are so liable in their sleep, and which is so weakening to the body, is solely the effect of such persons sleeping with their mouths unclosed; and the same unpleasant and exhaustive effects result to the animal system, from the same cause, when exercising by walking or running.

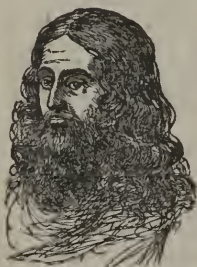
*What is the cause of stammering, and how may it be remedied?*

In persons who have "an impediment of speech," it is caused by an attempt on their part to speak too hastily, or while in a state of nervous excitement or agitation. No part

of the vocal organs are wanting, but some parts are imperfectly under the control of the will. In the young and middle-aged this defect may be remedied by patient and judicious training. By at first repeating only the words that can be articulated distinctly, and then by a similar repetition of other words, until all the words in common use may be spoken without hesitation or intermission.

## LESSON NINETEENTH.

### The Hair and the Nails.



*Why are our heads covered with hair ?*

To serve as a protection from the sudden changes of the atmosphere ; the hair being a non-conductor of heat or cold. The hair also serves to shield the brain from injury by bumps or knocks.

*Has each hair a separate root or bulb ?*

It has ; and this root or bulb extends below the *real skin*, and is fed by an artery which supplies it with the material from the blood for the growth of the hair.

*Is the hair supplied with nerves and blood-vessels ?*

No. The hairs are simply appendages of the skin, and like the outside skin or "*cuticle*" of the body, are secreted from the *real or true skin*. They have no blood-vessel or nerves, and therefore no vitality or life ; if they had, we should feel pain when they are cut or trimmed.

*What is supposed to give the various colors to the hair ?*

The color of the hair is supposed to depend upon the color of the fluid in the pith or central portion of the hair, running its whole length.

*What peculiarity is visible when the hair is seen through a microscope ?*

Each hair has on its surface pointed barbs or a beard that point towards the end. By sliding a single hair between the fingers, it will be found to go in but one direction. We may then conclude, that the object of this beard is to prevent the dust that may accumulate upon the hair from reaching the scalp or skin of the head.

*What gives the hair its beautiful glossy appearance ?*

A delicate oil, furnished by little glands in the true skin.

*What causes the hair to become gray, and what is the cause of baldness ?*

The fluid or coloring matter is but imperfectly secreted at



the root, and the pith of the hair is absorbed or dried up ; it then becomes gray. Baldness is occasioned by the closing of the canals which convey the fluid into the hair for its sustenance and growth, causing it to die and drop off. The skin then closes over these canals, and no art nor application of "Infallible Hair Restoratives" will open them again.

*Are people generally as careful of their hair as they should be ?*

No, they are not ; and, in consequence of the neglect, the scalp sometimes becomes diseased and inflamed. Cold water is the very best application in such cases, and upon all occasions where inflammation exists.

*What is the cause of the dry white scurf, or dandruff, upon the head ?*

This is natural and can not be prevented. When it exists the only necessary application to remove it is the frequent use of the hair-brush, and an occasional washing with pure water.

*Which is the most effectual, brushing, combing, or washing the hair ?*

Brushing is more effectual than combing, but combing is better than washing ; yet the head should sometimes be washed thoroughly with *cold* water—never with warm water or soap, as this is destructive to the oil, on which the health and beauty of the hair depend. After washing, it should be well dried with a coarse towel.

*Of what material are the finger and toe nails composed ?*

Chiefly of *albumen* ; a word signifying a *white substance*, and meaning a fine, thin, whitish matter. It is one of the substances contained in the chyle and blood.

*How are these nails produced, and of what advantage are they ?*

They are secreted, like the outer skin, by the true skin. The nails are, in fact, parts of the outer skin, and are deposited from beneath, in successive layers, or thin plates, so modified as to harden into little shields, for the better protection of the ends of the fingers and toes, and to enable them to take a firmer hold of whatever they may be required to do.

*In what respect do the nails differ from the skin to which they are appended ?*

The nails are a hard, elastic, flexible, and partly transparent substance, and present the appearance of a layer of horn.

*Of what use are the finger nails ?*

They give defence and support to the fleshy ends of the fingers, and thus enable us to do many things more readily and correctly than we could do without them.

*Of what benefit are the toe nails ?*

The nails of the toes not only serve as a protection, but they enable us to take a firmer footing, and to step, run, leap,

and balance the whole frame, with more vigor and precision than we otherwise could.

*May the usefulness of the nails be secured and increased by care?*

Yes; and for this purpose they should be kept so trimmed that their ends will completely cover and protect the flesh beneath, when anything is pressed against it. The nails should be frequently washed with soap and water, and a stiff brush, but should never be scraped. Clean nails are an evidence of neatness and refinement in all, especially with the female sex.

*What causes the toe nails to sometimes "grow into the flesh"?*

Short and tight boots or shoes. The forward growth of the nails being interrupted, they spread out on the sides and sometimes becomes unusually thick. The only sure preventive is to wear boots or shoes of ample size, which not only secures freedom to the growth of the nails and the circulation of the fluids of the feet, but also prevents the formation of the very painful excrescences well known as *corns*.

## LESSON TWENTIETH.

### Clothing and Dress, or Protection of the Body.



Winter Dress of an Indian.



Winter Dress of a Highlander.

*To what extent is clothing or dress necessary for the protection of the body?*

We are so much the creatures of habit, and have been so long accustomed through many years, and even from generation to generation, to cover the body with clothing, that it is difficult to determine how great a degree of cold the body could endure in the absence of clothing. Even in summer we should not feel as comfortable without clothing as we now do with it.

*To what extent are the Indians in cold climates clothed?*

The North American Indian wears much less clothing than his more civilized neighbors. The Indian is satisfied and comfortable with his blanket for his back and shoulders, his girdle for his loins, and his moccasins for his feet, while his breast and limbs are nearly or quite bare.

*To what extent is the Highlander of Scotland clothed?*

In the costume of the Highlander, who lives in the northernmost parts of Scotland, the kilt or short petticoat scarcely reaching his stockings, and as he wears no pantaloons his flesh about his knees is bare and exposed to the cold of his very severe climate, and yet he seems to be as comfortable as his southern neighbors whose limbs are more carefully protected from the weather.

*Is there a difference in the habits of people of more temperate localities?*

Yes, there is a great difference. Some persons always wear thick clothing from the first approach of autumn, until the warmth of spring, and never venture abroad without an overcoat or an extra shawl, while others dress much lighter, and a few perhaps find no days in winter so cold as to require any extra covering. It would, therefore, appear that the amount of clothing which the body actually requires depends wholly upon the health and habits of the individual.

*What, then, next to keeping a clean skin, is essential to health and comfort?*

Clean and proper clothing, neither too much nor too little; the quantity to be regulated by our feelings and the state of the atmosphere.

*In what manner does clothing protect the body from cold?*

Not by imparting any warmth of its own, for it has none to impart; but by preventing the warmth of the body itself from escaping, and the cold without, from coming in contact with the body.

*Why is linen clothing found to be cooler than woollen?*

Because linen cloth having a closer and more compact texture, holds less air in its meshes, and, for this reason, conducts heat away more rapidly than woollen cloth. So, cotton cloth is warmer than linen, but woollen the most so; and woollen, again, is not as warm as fur, nor is fur as warm as down. In short, the closer the texture the better the conductor, and the more open the texture the more air it contains, and therefore the warmer the clothing.

*Why is too little clothing in winter objectionable?*

Because it exposes the body to all the sudden changes of the weather. Colds, coughs, consumption, fever, rheumatism, and other diseases, are often the result of scanty clothing.

*May too much clothing be injurious as well as too little?*

Yes; for it not only prevents the ready escape of perspiration, but tends to increase it. The best practical rule is, that all persons wear just so much clothing, of proper kind

and quantity, as will protect them from the sensation of chilliness and cold, and no more nor no less.

*Should we depend upon clothing only for the warmth of the body?*

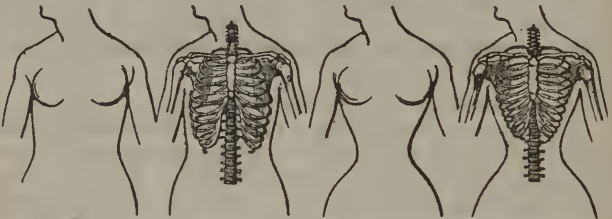
No; we should also seek it by exercising freely every day in the open air. If we neglect this, the body becomes weakened and relaxed. The more we exercise the less clothing will be required, and the more comfortable we shall feel.

*Should a dress be made so as to fit tightly about the body?*

No, such is very hurtful. A dress, tight over the chest, not only binds the ribs together, and thus prevents the free play of the lungs, but it crowds all the vital organs upon each other, so as to derange their proper action, and obstruct the circulation in all parts of the system. Thousands die annually, the victims of consumption, produced by tight-lacing.

*Should a lady wear in the waist of her dress whalebone, wood, or steel?*

No, never. Such casing and confining are deadly foes to health and life, as everything is which prevents perfect freedom of action to the vital organs. The ribs perhaps may be more easily changed than any of the other bones of the body. Their very structure is such that the constant pressure or tightness of clothing day after day, needs to be but slight to bend the ribs downward or inward.



Natural Form and the Ribs.

Fashionable Form and the Ribs.

*At what period in life will the ribs yield the more readily to compression?*

During childhood the bones are soft and pliable, and readily accommodate themselves to any position which is habitual. Tight-fitting dresses on a young lady from the age of fourteen to twenty, are the only appliances needed to make her sadly deformed in chest for the remainder of her life, which can not be of long duration in consequence.

*What great mistake do females commit in their manner of dress?*

It is well known that a loose and easy dress contributes much to give the sex the fine proportions of body that are observable in the Grecian statues, and which serve as models to modern artists, Nature being too much disfigured among



us to afford any such models now. The Greek women were ignorant of the use of whalebone stays, by which our women distort their shape, instead of displaying it. This practice is carried to so great an excess in America that it must in time degenerate the species, besides being in very bad taste.

*Can it be a pleasant sight to behold a woman's waist reduced in size?*

No: on the contrary, a wasp-like waist is as shocking to the eye as it is painful to the imagination. A fine shape, like that of a limb, hath its due size and proportion, a diminution of which is certainly a defect. Everything that confines and lays Nature under restraint is an instance of bad taste. This is as true in regard to the ornaments of the body as the embellishments of the mind. Life, health, reason, and convenience, ought to be taken first into consideration. Gracefulness can not subsist without ease, nor must a woman be sick in order to please.

*Is the wearing of flannel next to the skin thought good for the health?*

Yes; as it protects the body in a great measure from the injurious effects of sudden changes in the atmosphere. Flannel, being a bad conductor of heat, prevents the warmth of the body from escaping too fast.

*At what seasons of the year should flannel be worn?*

Many persons wear it all the year, but it is much better to put it on at the beginning of autumn, when the changes from heat to cold are sudden, and to leave it off during the summer months. This remark applies to persons in ordinary health. But people of feeble constitutions, and particularly children liable to the *summer complaint*, should wear flannel more or less thick, according to the season of the year.

*If flannel irritates the skin, what is a good substitute?*

Cotton or silk under-clothes. They are almost and perhaps quite as serviceable as flannel.

*What should be done when our clothes become wet or damp?*

When our clothes have become wet or moist with dew, rain, or perspiration, they should, as soon as possible, be changed for dry ones, and the whole surface of the body rubbed with a flesh-brush or coarse towel till it is glowing red.

*For what reason should our garments be worn loose and easy?*

Besides the reason already given for avoiding tight-dressing, loose garments are warmer in winter and cooler in summer than tight ones.

*Should flannel under-clothes be often changed?*

They should; for they soon become filled with the vapor or perspiration constantly escaping from the body. It would

be well to have two sets of flannels, one for the day, and the other for the night, and to air them well during the day.

*Should night-dresses for the same reason be well aired?*

They should. Instead of folding them up, as is the common practice, they should be hung up, to expose them to the action of the air all day.

*Do not bed-clothes become filled with the vapor that issues from the body?*

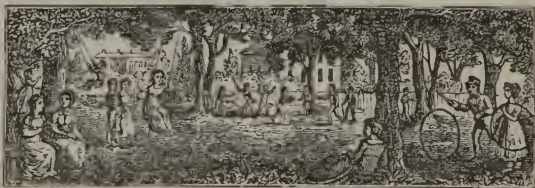
Yes. Beds as well as clothes become saturated with the vapor or perspiration which is constantly issuing from the body; and for this reason the bed-clothes should be taken off early in the morning, the bed shaken up, and the bedroom windows left open for several hours in each day.

*When this is not attended to what are the consequences?*

Impure air, nervous complaints, fevers, and bad health in various forms. Housekeepers and chambermaids are apt to say, that they have no time to wait for this airing. They are in too much haste "to have the rooms put in order." But they should remember that a bed is put *out of order*, when "made up" too soon, and that the best way to *save time* is to *save health*.

## LESSON TWENTY-FIRST.

### Exercise of the Body and Mind.



*Can a person enjoy good health without taking suitable exercise?*

Not for any great length of time; for the health and strength of the body and mind wholly depend upon the nature and quantity of the exercise taken. A person whose habits of body are active, has a better appetite and digestion, breathes more freely, has a freer circulation of the blood, a fuller development of muscle, and a clearer brain, than one who is inactive or sluggish.

*Does exercise enlarge and strengthen the muscles of the body?*

Yes: and in order that all the muscles of the body should have the full benefit, the exercise or labor should be *varied*, for the muscles which are the most employed are the strong-

est and the most fully developed, while those which are but little used become soft, enfeebled, and shrivelled.

*Where, when, and how, must exercise be taken to do the most good ?*

In the open air ; but not just before, nor immediately after, eating a meal, unless it has been a very moderate one.

*Why is exercise injurious just before eating ?*

Because the nervous vigor is directed during exercise upon those parts and organs which are most employed. If, therefore, exercise of the mind or body be taken just before eating, the digestive organs are not in the right condition for receiving food ; which should not be eaten until the nervous equilibrium has become sufficiently restored.

*Why should exercise be avoided immediately after eating a meal ?*

Because a vigorous action can not be sustained in two parts of the body at the same time ; one or the other or both must be imperfect. To insure a perfect digestion the stomach must be allowed to do its perfect work, and without interference from the action of other parts of the body. We, therefore, should permit the mind and body to rest awhile before and after each meal.

*Do not many persons delay walking for exercise until just before night ?*

They do ; but it is not a good practice. Between sunrise and sunset is the proper time for exercise out of doors. The air, toward night, is filled with a moist and miasmatic vapor arising from the ground, and therefore is not so healthy as at any other time of the day.

*What kind of exercise is the best to promote health and strength ?*

Such as will interest the mind, as well as give action to the body. Driving the hoop, jumping the rope, skating, swimming, riding on horseback or in a carriage, through cheerful scenes, are all healthy exercises, if taken at proper seasons, and will serve to strengthen the body and invigorate the mind.

*Should excessive or violent exercise be avoided as injurious ?*

Yes. If the exercise is too violent or too long-continued the body is rather exhausted than invigorated. The exercise should never go beyond a slight fatigue, never to exhaustion ; nor should it be allowed to produce that uneasy restlessness which unfits one for any other immediate duty, and which rather wears upon than adds to the general health.

*Does thinking, or keeping the mind in an active state, benefit the health ?*

It does, for mental effort exercises the brain. The brain, as before stated, runs, by means of the nerves, through every part of the body. The soundness and health of the body depend very much on the sound, healthy state of the brain and

nerves. In short, the mind and the body are continually acting and reacting on each other; the mind on the body through its affections and passions, and the body on the mind through its organs of digestion and secretion, and through its nervous influences.

*Do not slaves and other ignorant people enjoy good health?*

They do; but it is not because of their ignorance and mental inactivity, for notwithstanding these, they enjoy good health. Besides, such persons are usually restricted by their condition, to a temperate diet, and live much in the open air. When, however, disease does fall upon them, they have less mental energy to resist it, and are but too apt to yield to it at once in weakness and despair. The mind, if strong and well trained, has a great control over the pains and diseases of the body.

*Does a proper degree of study, then, improve the body as well as the mind?*

Yes; for man has a mind to be exercised and kept healthy, as well as a body. If a man were to sit still in a chair for one year, the health and strength of his body would be seriously, perhaps irremediably, impaired. So, if he neglect the vigorous exercise of his mind, for only a short time, all its powers are weakened. Hence we may see the cause of so many 'mental dwarfs.' They have neglected reading and thinking, and are filled with superstitious notions, which cramp and belittle the mind.

*What was the remark of the great philosopher, Sir Francis Bacon?*

He said: "Reading makes a full man; conversation a ready man; and thinking a great man."

## LESSON TWENTY-SECOND.

### Effects of Alcoholic or Spirituous Liquors on the Body.



*How is the stomach affected by the drinking of spirituous liquors?*

The stomach becomes deranged, and its natural form and color are changed. If the stomach of a person, who has been in the habit of drinking much alcoholic or spirituous liquor,



be examined after death, the inside of it will be found to be feverish and inflamed, and all the little vessels filled with impure, black blood. The stomach of a drunkard is lined within with a hard crust, which greatly retards digestion, and rapidly produces disease in consequence.

*Do spirituous liquors burn the stomach as they do the mouth and throat?*

Certainly; only much worse, because the hot, fiery stuff soon leaves the mouth and throat, but *remains* in the stomach. If the burning drink should remain as long in the mouth and throat as it does in the stomach they, being more sensitive, would shortly be in a blistered state.

*When the stomach is diseased, are other parts of the body affected?*

Yes, all parts are; the head aches, the lungs and liver are disordered, and the whole system is more or less distempered.

*What effect has drinking alcoholic liquors on the liver?*

The effect is to enlarge it. The liver of the drinking man soon becomes of a frightfully unnatural size.

*What is the natural color of the fluid in the liver?*

Bright yellow; but the drinking of intoxicating liquors changes it to a black, thick substance, much like tar.

*How do alcoholic liquors affect the brain and the heart?*

They harden and shrink the arteries of the brain, and excite the heart to a very hurried and unnatural action, which increases the wear and hastens the decay of the whole system.

*Is the blood injured by drinking alcoholic or intoxicating liquors?*

Yes, its healthy properties may be nearly destroyed; for alcoholic liquors deprive the blood of its light-red color, by taking out its living principle. The blood of an habitual drinker is much darker than that of a temperate person.

*Is there any nourishment in alcohol, in whatever form it may be found?*

No, not one atom! Whether in the form of beer, cider, wine, rum, whiskey, or brandy, *alcohol* is not digested in the stomach; neither does it make chyle. This poisonous stuff passes into the blood, and is found in the brain, and in other parts of the system, *unchanged* from what it was when first taken into the mouth.

*What evil results arise from the habit of using intoxicating drinks?*

Besides the irreparable injury to the body, the habitual drinker will almost invariably neglect and abuse his family. If he is a skillful mechanic his skill becomes impaired, and he is then compelled to apply his hands to coarser work, and finally betake himself to the rudest labor, or become a degraded street vagrant. Therefore, all should avoid even the *first* taste of that which may in the end prove their ruin.

## LESSON TWENTY-THIRD.

## Man, or "the Human Form Divine."

*In what does man, in bodily structure, differ from every other animal?*

In his erect or upright position, and the peculiar construction of his hands and feet; but more especially in the eyes, which man can move in every direction, while the eyes of other animals are fixed. The skin or the outer covering of his body is also different from any other animal.

*Is there anything else in which man differs from every other animal?*

His brain is larger and more perfectly developed, than that of any other animal in proportion to his size. Man has articulate language, reason, imagination, wit, and humor; and he knows, or *can know*, what is true and what is false, what is right and what is wrong. Man is also a being capable of being educated in a career of endless improvement.

*Are not other animals, likewise, capable of being educated?*

No, not in any just sense. Their nature, or *instinct*, is as knowing *at first*, while they are young, as in after-years, though the number of objects or purposes, to which it can be applied, may be somewhat increased. Man was created to be educated, and beasts were made for his use.

*Are all the senses combined in man more perfect than in any other animal?*

They are; though a few animals have some one of the senses more perfect than man. Thus the eagle can *see* farther, the dog can *smell* more keenly, and some insects, with their slender feelers, can *feel* more nicely.

*What faculty has man that is not found in any other animal?*

The moral or religious faculty; the faculty which tells man he *ought to do right*, and which gives him pain when he does wrong; the faculty that tells us we *ought* to worship the Creator of all things. Other animals have not this faculty.

*Has any species of animals improved like man?*

No; the first beehive, the first anthill, the first bird's-nest, the first beaver's dam and dwelling-house, the first spider's web, have only been repeated through their countless generations, the last one being not only no more skillfully made than the first, but exactly like it. They also remain without any tools, or knowledge of the laws and uses of the mechanical powers, to exercise their skill upon the objects around them. They have nothing but the muscles and instinct given them at that mysterious beginning, when the Creative Word first sent them forth, "each after his kind."

## LESSON TWENTY-FOURTH.

## Longevity, or the Length of Animal Life.

*Do most of the infants that are born live to an advanced age?*

No. Of all the infants born, only one half live to see their eighth year; but one third of the whole number live beyond their fourteenth year; and but one fourth of all that are born survive their twenty-first year; or, in other words, three fourths of mankind die before they reach an adult age.

*What is the reason of so great a mortality among children?*

Because in most instances their parents are unacquainted with Physiology, and leave all that relates to the diet, exercise, and general health of their children, to the care of chance and the doctors, until too late to save their lives.

*What general rule is there which tells the length of animal or vegetable life?*

"Whatever grows quickly, decays equally quickly," or, as it is worded in the old proverb, "Soon ripe, soon rotten."

*Can this rule be proved true by any illustration?*

Yes; a man who is twenty-five years coming to maturity, lives, not very unfrequently, to eighty or ninety years, and, occasionally, some to even over one hundred years. But the dog, that attains his growth in two years, seldom lives to be more than ten or twelve years of age.

*Are fishes a long time in attaining their full growth?*

They are; and some of them live from two to three hundred years. A pike was known to have lived still longer.

*Can you mention some other instances of longevity or long life?*

The elephant is thirty years in attaining his full growth, and lives two hundred years. The rhinoceros attains his growth in fifteen years, and lives from eighty to ninety. The camel attains his full stature in four years, and lives to from forty to fifty. The horse is also four years in growing, and lives to thirty. The sheep attains his full growth in about a year, and lives but eight or ten. The hog usually ceases to grow in from twelve to sixteen months, and lives about as many years.

*Does the same general rule apply to birds?*

Yes; the smaller kinds attain their full growth in a few months, and usually live but three or four years.

*Do the larger birds generally live longer than the smaller ones?*

They do; but there are various exceptions to this rule. For example, the raven and the eagle attain their full size in a short time, but they live from fifty to one hundred years.

*Has the toad been known to live a long time ?*

Yes ; one was known to have lived thirty-six years ; and occasionally living toads have been found enclosed in compact masses of rock, in which they must have been shut up for hundreds of years perhaps.

*Are insects usually long lived ?*

No ; they are generally very short-lived. There are insects, called *ephemerous* (a Greek word meaning "for a day"), whose lives begin and end between the rising and setting of the sun.

*What may be regarded as the limit of man's life ?*

Seventy years ; some persons live to a more advanced age ; but this refers only to the limit of his bodily existence on earth. Man's mind or spirit—his soul—continues to live for ever.

*Will they who die young, even in infancy, continue to exist hereafter ?*

Yes, as long as they who have existed on the earth many years. The soul of man is immortal ; and although this high destiny, decreed for him by his Creator, when he made him "a little lower than the angels, and crowned him with glory," had long been the hope of some, and the dream of many, yet was it "fully brought to light" only in the Gospel, as part of "the glad tidings" announced from heaven by the descended Son of God.

### A parting Word of Advice to our Young Readers.

Having gone as fully into the most important but much neglected study of Physiology as our limited space will permit, and having given in this work but an introductory or primary glance at its more important teachings, we would earnestly urge our young readers to still further pursue this most interesting of all studies. A great number of books have been written on this subject ; and among them are the following, from which we have gathered many of the facts we have stated.

THE PRACTICAL PHYSIOLOGY, by Edward Jarvis, M. D. Published in Philadelphia, by H. Cowperthwait & Co.

THE LAWS OF HEALTH, by Wm. A. Alcott, M. D. Published in Boston, by John P. Jewett & Company.

ANATOMY, PHYSIOLOGY, AND HYGIENE, by Calvin Cutter, M. D. Published in New York, by Clark, Austin, & Smith.

Every family should possess one or more works on Physiology, to consult as they would a "Family Physician," and to teach them not only how to preserve health, but how health may be restored, when from neglect or inattention to the laws of nature it has become partially destroyed. The proper study of man is to know himself physically as well as morally.

☞ Would you possess a copy of either of the above-named books, enclose, with your address, a one-dollar bank-bill, or its equivalent in postage stamps, directed to the publisher of the book desired, and you will receive it by mail, free from any charge for transportation.



# TAKE HEED! TAKE HEED!!

## Two Hundred Millions of Colds contracted Annually!

*A simple Cold is but the kindling of a Fever, Fire, or Conflagration, which, if not checked, will destroy the vital powers of the whole system.*

From Dr. Alcott's "Laws of Health."

A Cold is a Disease, as truly so as small pox, fever, cholera, or consumption. Like other diseases, too, it makes inroads, greater or less, upon the constitution. It is, moreover, liable to be repeated. They who have recently had the small-pox, or measles, or scarlatina, or typhus fever, or indeed almost any acute disease, are not likely to have them again. But the more colds we have, the more we seem inclined to have. Nor is this all; nor is it the worst. Colds, besides being of themselves troublesome diseases, by inducing debility, pave the way for numerous other diseases, such as pleurisy, bronchitis, fever, and consumption. And when they do not lay the foundation of a new disease, they often, by repetition, excite or arouse to activity many a sleeping predisposition, hitherto latent in the system.

It is estimated by some (though I confess rather loosely) that we have in the United States, every year, at least two hundred millions of colds. This is only an average of about eight to each individual. One half of our people die of fevers, and one fourth, or nearly so, of the various kinds of consumption. A large proportion of the remaining one fourth die of bowel complaints. Now, must it not be highly desirable to know the art of preventing a disease, which, besides being a serious evil in itself, is liable to induce, hasten, or aggravate those complaints which destroy more than three fourths of our entire population.

The question then arises, *How may colds be prevented?* To effect so desirable an object, *we must obey the laws of the skin*, which relate to light, air, temperature, compression, irritation, cleanliness, dress, state of the mind and heart, etc. Some of us in order to obey all of the laws of the skin would be compelled to change almost all our habits, if not betake ourselves to a new calling. Others, however, will find little difficulty but the want of resolution.

As a preventive, they who would avoid colds, must not muffle themselves, especially their faces and throats, every time they go into the open air. I am writing now for those who, as yet, deem themselves healthy. After brisk walking, or other exercise, during which they have worn more than a needful amount of clothing, they must beware of throwing off a part of it, and sitting down in a temperature which is very low, or in air which is damp, especially if they have been in a free perspiration. It would be safer to add more clothing under such circumstances than to diminish it.

Those who would be perfect in this matter, should avoid sitting with wet feet after exercise, or sleeping in damp clothing. While a person is exercising in the open air, if not overheated or over fatigued, it may be safe to have wet feet. Indeed, some may go with wet feet all the forenoon, without injury, if they but keep in motion.

They who are accustomed to warm clothing should not exchange it for that which is extremely thin, when they are about to go abroad into the cold air, unless they are to walk or exercise. Thousands of young persons, especially females, might trace the consumption, neuralgia, or fever which destroyed them, to some act of recklessness like that which is implied by the foregoing.

# WEBSTER'S ROYAL OCTAVO DICTIONARY,

AT ONLY THREE DOLLARS AND FIFTY CENTS!

*Containing ALL THE WORDS in the Quarto UNABRIDGED Edition, except in the more extended definitions. With an arrangement of SYNONYMS under the leading words, a New and important Feature.*

REVISED AND ENLARGED,  
By CHAUNCEY A. GOODRICH, D. D.

PROFESSOR IN YALE COLLEGE.

The demand for an edition of WEBSTER'S DICTIONARY, full, comprehensive, and of convenient size for daily reference, has led to the preparation of the ROYAL OCTAVO. The great favor with which it has been received, both in this country and England, is the best evidence of the value of the work.

The low price of \$3.50, in strong, substantial binding, brings it within the reach of all who desire a complete Dictionary.

## Webster's University and Family Pronouncing DICTIONARY, FOR COLLEGES, ACADEMIES, AND FAMILY USE. Retail Price \$2.00.

This is a NEW, REVISED, and ENLARGED Edition, containing much more matter than the old University edition (which it supercedes), and many important improvements, among which are the *Synonyms*, a leading feature in this, as well as the Royal 8vo edition.

## WEBSTER'S SPELLER AND DEFINER, INTENDED TO BE USED IN PRIMARY SCHOOLS AS A Spelling Book and a Dictionary, Containing a Selection of twelve thousand of the most useful Words in the English Language, with their Definitions. By WILLIAM G. WEBSTER, SON OF THE LATE NOAH WEBSTER, LL. D. Retail Price 20 Cents.

✍ The Fourth Hundred Thousand copies of this book since its late publication is now being issued, and the demand is rapidly increasing.

PUBLISHED BY J. B. LIPPINCOTT & CO.,  
No. 20 North Fourth Street, PHILADELPHIA,  
And for sale by all the Booksellers throughout the United States.

✍ Copies of the above books will be sent by mail, free from postage, upon the receipt of the prices annexed to them.

*"The Schoolmaster should insist upon their use in his School."*

## WEBSTER'S SCHOOL DICTIONARIES.

**MASON BROTHERS, 108 & 110 Duane St., NEW YORK,**

Are the sole publishers of the various school editions of WEBSTER'S DICTIONARIES. They have been carefully adapted to the use of Colleges, Academies, Seminaries, and Common Schools; also for Counting-houses, Families, and the Pocket.

### Webster's Counting-house & Family Dictionary,

522 pages. Royal Duodecimo. Price \$1 50.

THIS is an entirely new abridgment of Dr. Webster's large work, just completed, and which to all wishing a comprehensive Dictionary less in size than the complete work, will commend itself as combining greater excellences than any other abridgment. It has been compiled by the joint labors of William G. Webster, Esq. (son of Dr. Webster), Professor Goodrich of Yale College, and Professor Porter of Yale College, with incidental aid from other competent sources. Every definition has been carefully scrutinized, new words and new significations are added, and in every department a perfection is secured, not, we are confident, hitherto attained.

### Webster's Academic Quarto Dictionary.

522 pages. Cap Quarto. Price \$1 25.

DESIGNED for the Higher Schools, Academies, and Colleges. This book contains all the important words of our language, in connection with those exact and comprehensive definitions for which Dr. Webster's Dictionaries have been so much distinguished; with vocabularies of Greek, Latin, Scripture and modern Geographical names, with rules for the pronunciation prefixed to each. Also a collection of Familiar Phrases, Words, and Proverbs, from the Latin, French, Italian, Spanish, and Greek, with brief definitions; a concise account of some of the principal Heathen Deities, Heroes, etc., and an extensive list of Abbreviations with their explanations. No pains have been spared to make this work suited to the important place which it is designed to occupy in the Colleges and Schools of our country.

### Webster's High School Dictionary.

(Revised Edi'n.) 360 pp. Medium 12mo. Price 80 cents.

THIS book is a very careful revision of the work of a similar title, which has enjoyed a wide circulation the past few years; and indeed is a new, but much improved edition of that volume. Its design is to furnish a vocabulary of the more common words of our Language, with many technical terms in the arts and sciences. In most instances the ORTHOGRAPHY when disputed is given in both forms. The subject of PRONUNCIATION has been reviewed with great care. Irregular plurals are given in this work, as also the plurals of nouns in *cy*. There is also a vocabulary of geographical names, with their pronunciation; words and phrases from the Latin and French translated into English; Mottoes of the United States; Abbreviations explained; a concise account of Heathen Deities and Heroes; an alphabetical table of Scripture and proper names of persons, with their original significations, and a collection of common errors in grammar, spelling, and pronunciation corrected.

### Webster's Primary School Dictionary.

320 pages. Square 16mo. Price 42 cents.

THIS is an abridgment designed for Common Schools. It contains 10,000 words more than Walker's, and is sufficiently copious for Primary School purposes. A pronouncing Vocabulary of Geographical names is included.

### Webster's Pocket Dictionary.

Diamond 32mo. Price in Roan Binding 50 cents;

Roan, gilt edges, 62½ cents; Tucks, gilt edges, 75 cents.

THIS edition is designed for pocket and every-day use. To the teacher and scholar; the merchant and clerk; the mechanic and farmer, in fact to every body, this little work will prove an invaluable companion. It gives the spelling of the irregular particples, also the irregular-formed plurals of nouns and other derivatives, the rules for the correct orthography of which being so perplexing that persons of good education are not unfrequently unable to remember them.

Copies of the above-named books will be sent by mail—postage prepaid—upon the receipt by mail of the prices annexed—addressed to the PUBLISHERS.



7651-15

40

AT WHOLESALE OR RETAIL,

# THE PUBLICATIONS OF GEORGE F. COOLEIDGE

May be obtained through the  
**Booksellers at the following-named Places,**  
*and of all the principal Booksellers in the United States.*

Portland.....	Maine.	Cincinnati.....	Ohio.
St. Albans.....	Vermont.	Cleveland.....	"
Boston.....	Massachusetts.	Dayton.....	"
Springfield.....	"	Columbus.....	"
New Bedford.....	"	Delaware.....	"
Hartford.....	Connecticut.	Portsmouth.....	"
New Haven.....	"	Zanesville.....	"
Norwich.....	"	Toledo.....	"
Bridgeport.....	"	Indianapolis.....	Indiana.
Middletown.....	"	Madison.....	"
New York.....	New York.	New Albany.....	"
Troy.....	"	Terre Haute.....	"
Utica.....	"	Delphi.....	"
Rochester.....	"	Fort Wayne.....	"
Buffalo.....	"	Lafayette.....	"
Ogdensburg.....	"	Chicago.....	Illinois.
Watertown.....	"	Alton.....	"
Newark.....	New Jersey.	Springfield.....	"
Philadelphia.....	Pennsylvania.	East Rockford.....	"
Pittsburgh.....	"	Rock Island.....	"
Baltimore.....	Maryland.	Peoria.....	"
Richmond.....	Virginia.	Galena.....	"
Wheeling.....	"	Detroit.....	Michigan.
Wilmington.....	North Carolina.	Grand Rapids.....	"
Fayetteville.....	"	Iowa City.....	Iowa.
Charleston.....	South Carolina.	Burlington.....	"
Columbia.....	"	Fort Des Moines.....	"
Savannah.....	Georgia.	Muscatine.....	"
Augusta.....	"	Davenport.....	"
Macon.....	"	Keokuk.....	"
Columbus.....	"	St. Louis.....	Missouri.
Mobile.....	Alabama.	Lexington.....	"
New Orleans.....	Louisiana.	Boonville.....	"
Nashville.....	Tennessee.	Milwaukee.....	Wisconsin.
Memphis.....	"	Galveston.....	Texas.
Knoxville.....	"	Houston.....	"
Louisville.....	Kentucky.	St. Paul.....	Minnesota.
Maysville.....	"	Portland.....	Oregon.
Lexington.....	"	San Francisco.....	California.